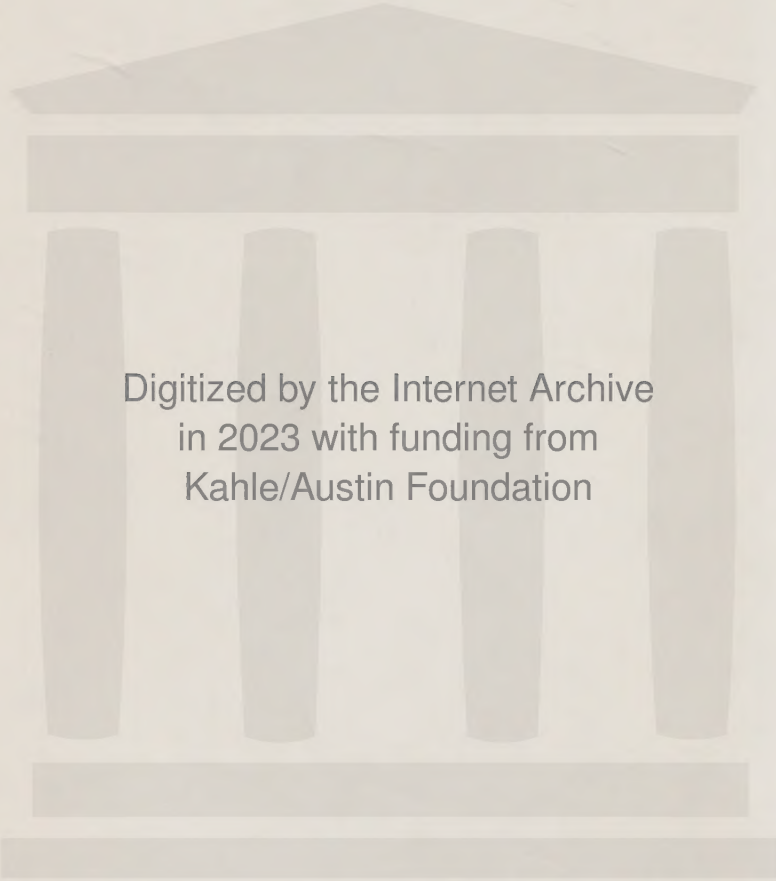


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Articles

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and Mead Cain*

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The Bangladesh Development Studies

Volume III January 1975 Number 1

Articles

- 1 Family Planning in Bangladesh : An Empirical Investigation
Ismail Sirageldin, Monowar Hossain and Mead Cain

- 27 Money and Inflation in Bangladesh
A. K. M. Siddique

- 43 A Comparative Analysis of Small Scale Irrigation in Bangladesh
Md. Fazlul Haque

- 53 A Study of Oral Pill Acceptors of the Bangladesh Post-partum Family Planning Programme
Atiqur Rahman Khan, A. F. M. Burhanuddin, Stanislaus M. D'Souza and Lincoln C. Chen

Notes

- 77 Pricing Policy for State Enterprises in Bangladesh
W. B. Reddaway

- 83 Education and Land Utilisation in a Developing Region : A Study of Gujarat
D. R. Veena

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Family Planning in Bangladesh : An Empirical Investigation

by

ISMAIL SIRAGELDIN, MONOWAR HOSSAIN AND MEAD CAIN*

I. INTRODUCTION

The year 1971 saw the emergence of Bangladesh as the eighth most populous nation on earth, a country combining extreme poverty with high density. One of the main challenges that faces this new nation in its quest for social development is the challenge of controlling its rate of population growth. With a crude birth rate close to 47 per thousand and a crude death rate close to 17 per thousand, the country's rate of population growth is estimated in the neighbourhood of 3 per cent per annum. This implies, at least in the immediate future, an annual net addition of about two million people. These are staggering annual additions that will certainly create enormous demands on the country's scarce resources.

The purpose of this paper will be to critically examine the response of Bangladesh's population as of 1968/69 to the National Family Planning Programme in terms of the pattern and extent of knowledge and practice

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The results of this study are based on findings from the National Impact Survey that was conducted in 1968/69 in the then East Pakistan. The survey was a result of a combined and dedicated effort of so many people that it is not easy to acknowledge all individually in such limited space. Acknowledgement, however, must be made to the then Control Evaluation Unit, its Director and Senior Staff and to a dedicated field staff of interviewers, supervisors, and editors and coders.

of family planning. Unfortunately the reported level of practice is prohibitively low for a detailed analysis of use differentials. With less than four per cent reporting current use, Bangladesh is essentially a non-contracepting society. Under these circumstances, future demand is perhaps more relevant to population planning and accordingly, the analysis will examine both current use and the intentions of wives to use a family planning method in the future.

The findings reported below clarify the relative importance of supply and demand factors in programme implementation and should have important implications for the design and evaluation of population policies in Bangladesh.

II. FAMILY PLANNING ACTIVITIES IN BANGLADESH

The necessity of controlling population growth as an important element in development planning and as a pre-requisite for achieving desired social goals was seriously recognized as early as 1965 when a large scale National Family Planning Programme was initiated in erstwhile Pakistan. After independence the Bangladesh government acknowledged the seriousness of the population problem and gave it high priority in its social planning and is currently developing a comprehensive population policy [7]. Some of the elements of the new policy will differ from that of the previous experience. However, information about the outcome of the previous policy efforts was never adequately documented. Such documentation is clearly needed.

The main objective of the erstwhile Pakistan National Family Planning Programme (1965-70) was to reduce the birth rate from 50 to 40 per 1000 by protecting 25 per cent of the fertile couples by 1970 [3]. Its basic strategy was to develop an intensive infrastructure of family planning personnel and facilities in order to make family planning information, services, and contraceptive supplies readily available to the population. In 1969 it is estimated that the total staff in the national programme in Bangladesh included about 1,000 doctors certified for IUD and vasectomy operations, about 200 fulltime lady family planning visitors, about 250 lady home visitors, about 17,000 part time *dais* (village midwives), about 20,000 part time agents (selling condoms and conventionals), 1,700 assistants, and about 600 officers and 56 executives. Also, there were over 800 hospitals, clinics and centres that provided Family Planning services and over 40 mobile teams (conservatively estimated, based on [5]).

In order to put our present analysis in perspective, it is important to make explicit the assumptions underlying the strategy of the programme because its success or failure may rest with the validity of such assumptions as much as with the efficiency with which the plan is put into operation. As with many other family planning programmes initiated recently in developing countries, the key assumptions were that there existed in Bangladesh a latent demand for family planning, i.e., couples had unwanted pregnancies; that a large part of that demand would become overt and could be met by providing the necessary information and services; that couple could be motivated through a national educational and communication campaign to accept lower family size norms; and that the total effective demand so generated would be sufficient to meet the programme target.

III. DATA SOURCES AND METHODOLOGY

The analysis is based on cross-sectional data obtained from a national survey of 3,088 married women conducted in Bangladesh in 1968/69. The survey was part of the erstwhile Pakistan National Impact Survey. The sample was multistage, and internally self-weighted within urban and rural strata. The data obtained from this survey constitutes the most recent national information for Bangladesh. For details see [1; 2; 6; 8]. Gross socio-demographic measures from the survey lend confidence in the overall reliability of these cross-sectional findings. For example, the median age of wives (up to the age of 49) is estimated at 28 years, the median age at marriage at 13 years, and median number of living children at 3.4.

The first part of the analysis will give a brief account of the pattern of family planning knowledge and practice in Bangladesh. The second part attempts a more rigorous two-stage multivariate analysis of the factors that affect wives' future intentions for family planning practice. The multivariate analysis is based on the Automatic Interaction Detection Computer Programme (AID). This is essentially a flexible statistical technique that assumes no additivity or linearity in effect of the predictor variables. Because of the type of data and the exploratory nature of the analysis, it is felt that this technique is suitable for our purpose [4; 10].

IV. GENERAL FINDINGS : KNOWLEDGE AND PRACTICE OF FAMILY PLANNING

In this section we present a brief summary of the general findings on the diffusion of knowledge and practice of family planning in

Bangladesh as of 1968/69 within a simple analytic framework that depicts the input-out relations of the family planning programme and its implied assumptions.

Knowledge about Family Planning

The National Family Planning Programme was apparently successful in communicating the concept of family planning to the majority of Bangladesh women. As Table I indicates, 52 per cent of rural and 71 per cent of urban Bangladesh wives less than 50 years old, had heard about some method of family planning and of these more than 80 per cent heard about it after the inception of the programme in 1965/66. The figures in Table I are based on a preliminary

TABLE I

TIME FIRST HEARD ABOUT A FAMILY PLANNING METHOD, BY URBAN-RURAL RESIDENCE FOR 3088 BANGLADESH WIVES IN 1968/69

Time First Heard about Family Planning	Per cent + Heard about a Family Planning Method		
	All	Rural	Urban
Before 1966	6	5	14
1966/1967	12	12	18
1967/1968	22	22	25
1968/1969	<u>12</u>	<u>12</u>	<u>15</u>
Total Heard about Any Method**	52*	51*	71*
Did Not Hear about Any Method	<u>48</u>	<u>49</u>	<u>29</u>
	100%	100%	100%

*Sub-totals may not add due to rounding error.

*This question was preliminary and general. The question concerning knowledge of methods which Table II is based on, was more specific and probing, hence the discrepancy in reported knowledge. The subsequent analysis is based on the response to the more detailed question as reported in Table II.

+ Percentages in all tables in this paper are weighted as follows :

urban stratum : 1.00; rural stratum: 1.29; and for a very small rural subsample : 3.53.

question concerning knowledge of Family Planning. In fact, knowledge of methods was more intensive, as shown in Table II (63 per cent for rural, 83 per cent urban), which records the responses to more detailed questions on specific methods. Furthermore, most of the reported knowledge was about modern methods that were introduced to the country primarily through programme efforts. For example, 97 per cent of the reported knowledge was about the IUD and sterilization as opposed to less than 44 per cent about traditional non-programme methods.

TABLE II

KNOWLEDGE OF FAMILY PLANNING METHODS, PERSONS AND PLACES AND REPORTED USE OF A FAMILY PLANNING METHOD BY URBAN AND RURAL RESIDENCE, FOR 3088 BANGLADESH WIVES IN 1968/69

Knowledge and Use	Per cent Who Know or Use		
	All	Rural	Urban
Knowledge about Family Planning			
Know Any Method	64	63	83
Know Programme Method	62	61	81
Knowledge about the Delivery System			
Know Person	22	22	25
Know Place	14	13	19
Know Person and Place	8	8	10
Met a Person	20	20	23
Gone to a Place	3	3	4
Use of Family Planning Methods			
Ever Use	6.4	6.0	15.2
Current Use : All Methods	3.7	3.8	6.5
Programme Methods	3.3	3.2	5.8

These were in response to the following questions :

1. If a woman wants to delay or prevent a pregnancy, is there anything that she or her husband could do ? Anything else ? Have you heard of the following methods which some people use to delay pregnancy ? (For each method which the respondent has heard of, it is asked :) Have you (or your husband) ever used—? Did you or your husband use any method during the past two weeks ? What method did you use?
2. Do you know of anybody in this locality who gives advice or help in Family Planning? Have you ever met him/her ?
3. Do you know of any dispensary, clinic, shop, or any other such place from which you can get information and help on Family Planning? Have you ever gone to any of these places for help on Family Planning ?

But knowledge about a method does not necessarily lead to practice since such knowledge does not adequately reflect either consumer's effective demand for contraceptive practice or the effective availability of the programme delivery system. Indeed the objective of the family planning programme was not to 'diffuse knowledge about contraceptive methods alone but also to make available such services to all potential users. It seems pertinent, therefore, to examine the extent of couples' knowledge about the programme delivery system before examining the pattern of use.

Knowledge about the Delivery System

According to the design of the programme, each locality was to have a delivery unit facility that provided information, supplies, advice, and follow-up care. This planned comprehensive provision of services was one of the main logistic goals of the programme administration. It is evident from Table II that although 64 per cent of the wives reported knowledge of at least one family planning method, a much smaller proportion indicated knowledge about how to avail themselves of such services. For example, only 22 per cent reported that they knew of any person that gave help or advice on family planning; 14 per cent reported knowledge about a place that provided such services; and the combined knowledge about both personnel and places was less than 10 per cent for all wives or less than one-sixth of the wives who reported knowledge about methods. Furthermore, even fewer women reported that they had ever gone to a family planning place (3 per cent).

This is indeed a discouraging picture even after allowing for possible under-reporting. It indicates either an inefficient delivery system and/or a low level of consumers' interest in the concept of family planning as conveyed through programme efforts. In either case, such low levels of knowledge about the programme delivery system should be reflected in an even lower level of reported use.

Past and Current Use

The total reported ever use (past and current) of any birth prevention method was 6.4 per cent among all wives less than 50 years of age, including 3.7 per cent current users and 2.7 per cent past users. However, the reported use of programme sponsored methods was slightly lower, being 3.3 per cent for current use and 2.3 per cent for past use. Such performance is far below the expected target of cover-

ing 15-20 per cent of eligible women by 1968/69. The low reported use cannot be dismissed as due to sampling or non-sampling errors. It is evident that there were real shortcomings in supply and/or demand which resulted in such low performance.

We cannot conclude from these preliminary findings whether the apparent low level of programme performance is a result of a deficiency of demand rather than that of supply, i.e., that the message and the necessary related services had spread but no action was taken by the target population; or a result of a supply deficiency; or a combination of both. First, we must know more about the characteristics of acceptors. Knowledge and acceptance rates have been reported for all wives under 50 years of age, including those who do not need family planning and those whose practice may not have a significant demographic impact. It is important to assess the pattern of knowledge and use in terms both of demand indicators and programme implications. Second, there could be a problem of time lag since the diffusion process is not necessarily instantaneous, and indicators of intentions to use in the future could shed more light on the future impact of the programme.

The pattern of family planning diffusion in Bangladesh seems to parallel that of the early experiences of other countries with newly introduced programmes: a relatively high rate of acceptance among the middle aged between 30 and 40 years of age and the high parity women with at least five children, as illustrated in Figures 1 and 2.¹ Because of the low absolute reported level of acceptance, it is difficult to make a detailed analysis. It is instructive, nevertheless, to trace the patterns of knowledge about family planning and the delivery system, and reported use among groups with different fertility levels. For that purpose, respondents are classified by their age, the age of youngest child, and their pregnancy status into two main groups as illustrated in Table III. The first is the high fertility group including four main categories: (1) the non-pregnant young wives less than 20 years of age, (2) those 20-29 year olds with their youngest child less than five years old, (3) the 30-39 year olds with youngest less than five years old, (4) all pregnant women less than 40 years old. The middle two groups comprise 47 per cent of all married women under 50 but account for 70 per cent of all births during the last 12 months. The second main group is the low fertility group including women aged

¹ Figures 1 and 2 represent cumulative percentages. Thus, for example, the percentage of women currently using is determined by taking the vertical difference between the lines bracketing "currently using",

FIGURE 1
 PERCENTAGE USE OF CONTRACEPTION AMONG WIVES
 IN EACH AGE GROUP BY CATEGORY
 OF USERS, BANGLADESH

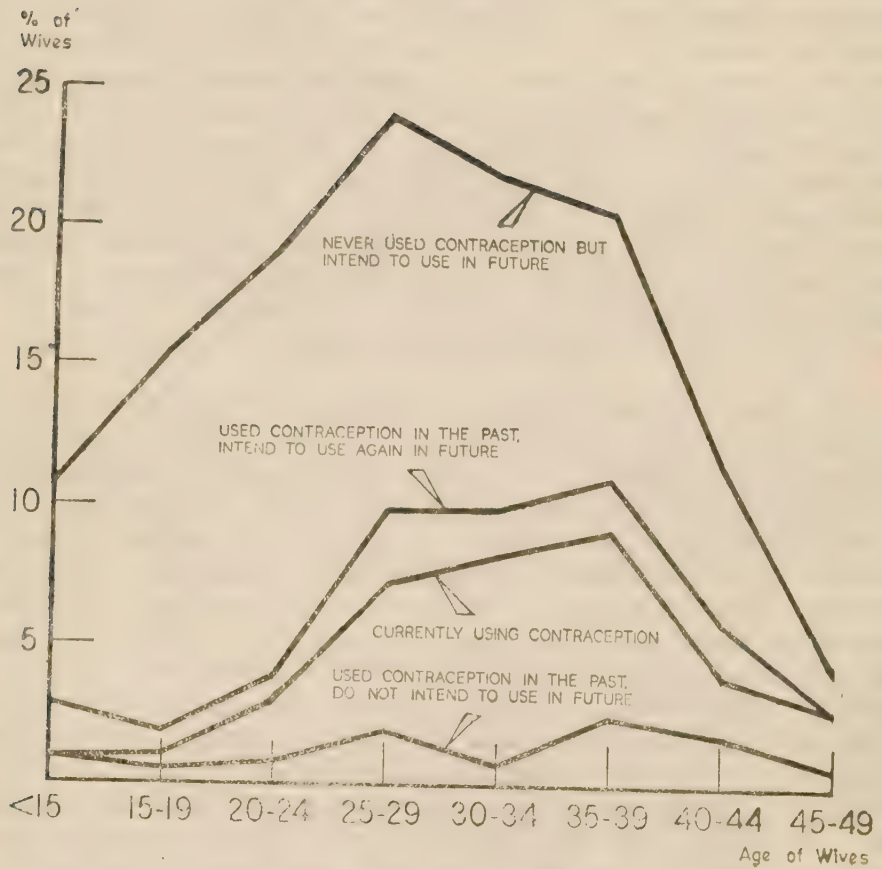
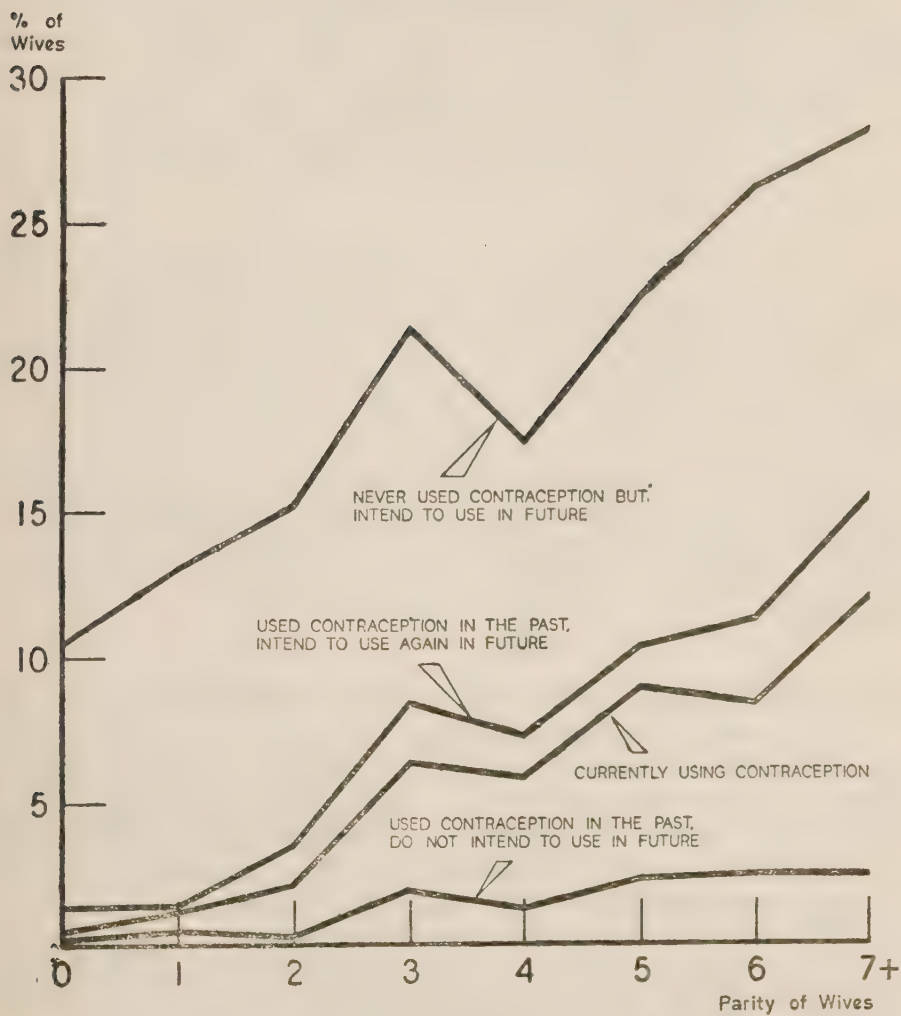


FIGURE 2
 PERCENTAGE USE OF CONTRACEPTION AMONG WIVES
 IN EACH PARITY BY CATEGORY
 OF USERS, BANGLADESH



20-39 with the age of their youngest child five years or more or with no children, and the 40 or older women. These last two groups comprise 23 per cent of the sample but account for less than five per cent of all births.

The groupings are somewhat arbitrary, however, our purpose is to differentiate *a priori* in a rough way expected levels of fecundity. In the low fertility group, women aged 40 and over are assumed to be in some state of secondary sterility, the women 20-39, who are either childless or whose youngest child is five years old or more, are assumed to be subfecund. Of course for this latter category it is possible that the low fertility exhibited results from the use of contraceptives, however, on average this is unlikely given the low percentage of ever use (about seven per cent).

Given the ultimate goal of the Bangladesh family planning programme to reduce the nation's birth rate, it is appropriate to focus on that group of women contributing most heavily to that rate. In the non-pregnant high fertility group there is a tendency for knowledge and use to increase with age. The pattern is more pronounced for urban residents than for rural residents, however, there is uniformity in the pattern of effective knowledge observed in Table III. Whereas the majority know of methods, very few of any category of women reported knowledge of the delivery system (family planning persons and places), which is necessary for the effective practice of family planning as perceived in the 1965-70 structure of the National Family Planning Programme.

Knowledge, Use and Demand Indicators of Family Planning

The incidence of family planning practice was shown to rise with age and parity in Figures 1 and 2. The relationship can plausibly be explained as increasing demand for family planning programme with age and parity, given that the family planning programme efforts were not age/parity specific. Interpreting use as a measure of consumer demand is not satisfactory to the extent that use is also a reflection of availability of programme services. Other indicators of demand are presented in Table IV. Using the same grouping of wives as in Table III, the percentage of women in each category whose number of living children exceeded or equaled their reported ideal family size, and the percentage who stated a preference for no more children are conceived as independent indicators of demand for family planning. Notwithstanding the doubtful reliability of response to questions about ideals

TABLE III

**TARGET POPULATION BY FERTILITY, FAMILY PLANNING
KNOWLEDGE AND USE FOR 2518 RURAL AND 570 URBAN
BANGLADESH WIVES IN 1968/69**

Target Population	N	Births per 100 Women in Last Year	% of All Births in Last Year	Percentage of (1) Who					
				Know F. P. Meth- od	Know F. P. Per- son	Know F. P. Place	Know F.P. Per- son and Place	Used in Past	Use Cur- rently
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
High Fertility Group				RURAL					
Non-pregnant Women									
<20 Yrs. of Age	405	31	21	54	17	10	5*	2*	0
Women 20-29, Youngest Child									
<5 Yrs. of Age	697	42	50	63	21	13	8	3*	4
Women 30-39, Youngest Child									
<5 Yrs. of Age	468	29	23	69	25	16	11	3*	8
Pregnant Women									
<40 Yrs. of Age	366	5	3	65	24	14	9	3*	0
(1) Total H.F.G.	1936	30	97	63	22	13	8	3	4
(2) Non-pregnant Women, 20-39 Yrs. of Age, Youngest Child									
5+, or No Children	229	4	1	66	23	19	9*	1*	6*
(3) All Women 40+	353	3	2	64	23	10	6*	2*	2*
All Women	2518	24	100	63	22	13	8	2	4
High Fertility Group				URBAN					
Non-pregnant Women									
<20 Yrs. of Age	84	39	24	67	13*	15*	11*	4*	2*
Women 20-29, Youngest Child									
<5 Yrs. of Age	164	40	48	85	25	15	8*	13*	7*
Women 30-39, Youngest Child									
<5 Yrs. of Age	111	27	22	88	34	23	12*	11*	14*
Pregnant Women									
<40 Yrs. of Age	80	5	3	84	25*	20*	9*	7*	0
(1) Total H.F.G.	439	30	97	81	25	18	10	10	7
(2) Non-pregnant Women, 20-39 Yrs. of Age, Youngest Child									
5+, or No Children	57	2	1	86	25*	26*	14*	7*	7*
(3) All Women 40+	74	4	2	82	27*	22*	9*	5*	7*
All Women	570	24	100	83	25	19	10	9	6

* <25 Cases.

TABLE IV

TARGET POPULATION BY LIVING CHILDREN RELATIVE TO IDEAL FAMILY SIZE AND DESIRE FOR MORE CHILDREN FOR 2518 RURAL AND 570 URBAN BANGLADESH WIVES IN 1968/69

Target Population	% With Living Child <Ideal F. S.	% With Living Child ≥ Ideal F. S.	% Non-numer- ic Response	Total* %	N	% of All Wives (5) Who Desire No More Children
	(1)	(2)	(3)	(4)	(5)	(6)
High Fertility Group						
RURAL						
Non-pregnant Women <20 Yrs. of Age	63	2	35	100	405	2
Women 20-29, Youngest Child <5 Yrs. of Age	42	21	36	100	697	30
Women 30-39, Youngest Child <5 Yrs. of Age	17	48	34	100	468	67
Pregnant Women <40 Yrs. of Age	45	15	40	100	366	15
(1) Total H.F.G.	41	23	36	100	1936	30
(2) Non-pregnant Women, 20-39 Yrs. of Age, Youngest Child 5+, or No Children	43	32	24	100	229	62
(3) All Women 40+	24	53	23	100	353	90
All Women	39	28	33	100	2518	41
High Fertility Group						
URBAN						
Non-pregnant Women <20 Yrs. of Age	70	6	24	100	84	8
Women 20-29, Youngest Child <5 Yrs. of Age	37	40	24	100	164	45
Women 30-39, Youngest Child <5 Yrs. of Age	18	55	27	100	111	75
Pregnant Women <40 Yrs. of Age	54	17	29	100	80	20
(1) Total H. F. G.	41	33	26	100	439	41
(2) Non-pregnant Women, 20-39 Yrs. of Age, Youngest Child 5+, or No Children	37	46	18	100	57	72
(3) All Women 40+	16	70	14	100	74	92
All Women	35	43	22	100	570	56

* Columns (1) - (3) may not add to 100% due to rounding error.

and desires (for a discussion see [8]), Table IV shows a clear positive relationship between age and demand for family planning among non-pregnant high fertility women in both rural and urban sub-samples. Furthermore, the correspondence between the two independent measures of demand (col. 2 and 5 of Table IV) encourages confidence in the stability of the relationship. Demand indicators illustrated in Table IV approximate the latent demand that programme planners assumed would become overt given the adequate supply of programme services. Aside from the possibility that supply was not adequate, there exist a number of potential cultural and social constraints to the emergence of real demand for family planning in Bangladesh. These potential constraints will be considered in the multivariate analysis to follow, however, the third column in Table IV is interesting in this respect. It shows that more than a third of the high fertility group of the sample of wives were unable to cope with the question of an ideal or desired family size, to which these women gave answers such as "God's will". A positive attitude towards the concept of fertility control must precede positive demand for family planning. This is further examined in our analysis of wives' intentions to use a family planning method in the future.

Demand and Availability of Family Planning Services

In an attempt to isolate the impact of effective programme availability of services on use of family planning, the pattern of knowledge and use is shown in Table V for those women expected to have a latent demand for family planning (women whose living children equal or exceed their ideal family size and who also expressed a desire for no more children). It is evident that women in all fertility categories with latent demand had more knowledge about both methods and persons and practiced family planning more than average, as a comparison with Table III indicates. Thus, it is likely and not surprising that women with a demand seek out family planning information and services. However, with respect to the impact of effective availability the important comparisons in Table V are between columns 7 and 9, and 8 and 10, which show that women who had access to programme personnel demonstrated close to twice the current use of family planning methods and more of them intend to use in the future as compared to all wives with latent demand. That the difference is more extreme for the rural subsample where access is more of a problem than in urban areas, strengthens the conclusion that bottlenecks in programme supply of services were a partial cause of the low levels of reported use.

TABLE V

TARGET POPULATION BY EFFECTIVE KNOWLEDGE, USE AND LIVING CHILDREN RELATIVE TO IDEAL FAMILY SIZE FOR 2518 RURAL AND 570 URBAN BANGLADESH WIVES IN 1968/69

Target Population	N	% of (1) Whose Living Children \geq Ideal	% of (2) Who Desire No More Children	Percentage of (3) Who					Percentage of (5) Who	
				Know F. P. Methods	Know F. P. Per-son	Used in Past	Curr-ently Use	Intend to Use	Curr-ently Use	Intend to Use
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
RURAL										
High Fertility Group										
Non-pregnant Women										
< 20 Yrs. of Age	405	2	50	100*	75*	0	0	50*	0	67*
Women 20-29										
Youngest Child										
< 5 Yrs. of Age	697	21	94	77	32	8*	10*	28	17*	46*
Women 30-39										
Youngest Child										
< 5 Yrs. of Age	468	48	96	79	33	5*	13	20	29*	22*
Pregnant Women										
< 40 Yrs. of Age	366	15	62	83	31*	9*	2*	43*	0	55*
(1) Total H.F.G.	1936	23	91	79	33	6	11	24	22	34
(2) Non-pregnant Women, 20-39 Yrs. of Age, Youngest Child 5+, or No Children	229	32	92	72	34*	1*	18*	5*	24*	4*
(3) All Women 40+	353	53	99	75	28	4*	4*	8*	6*	5*
All Women	2518	28	93	77	32	5	10	18	18	23
URBAN										
High Fertility Group										
Non-pregnant Women										
< 20 Yrs. of Age	84	6	80	75*	0	25*	0	50*	0	0
Women 20-29										
Youngest Child										
< 5 Yrs. of Age	164	40	89	93	28*	22*	10*	34*	13*	31*
Women 30-39										
Youngest Child										
< 5 Yrs. of Age	111	55	97	93	36*	15*	15*	25*	19*	24*
Pregnant Women										
< 40 Yrs. of Age	80	17	79	100*	36*	18*	0	64*	0	25*
(1) Total H.F.G.	439	33	91	93	31	19	11*	28*	15*	27*
(2) Non-pregnant Women, 20-39 Yrs. of Age, Youngest Child 5+, or No Children	57	46	96	88*	36*	8*	16*	4*	22*	0
(3) All Women 40+	74	70	96	90	36*	8*	8*	4*	11*	11*
All Women	570	43	93	92	33	15	11	23	11*	19*

* < 25 Cases.

The very low numbers of acceptors prevented an extension of the analysis in Table V to an examination of the percentage of users among wives who had knowledge of a family planning place and those who knew of both persons and places; however, it is likely that the importance of supply bottlenecks would be substantiated. Further analysis, however, is given in the following section when we examine in more detail wives' future intentions to use a method of Family Planning

V. INTENTIONS TO USE IN THE FUTURE : A MULTIVARIATE ANALYSIS

The diffusion of family planning knowledge and services in Bangladesh and the population's receptivity to the services may have involved a time lag which the cross-sectional survey interrupted, resulting in an under-estimate of the true impact of the programme. It could be argued that a fair assessment of programme performance should include couples' future intentions to practice family planning on the assumption that such intentions have been initiated through programme inputs and that they will be realized. Our purpose in this section is to analyze, more rigorously, the factors that influence wives' intentions to practice family planning in Bangladesh. A final assessment of the potential of family planning in Bangladesh and its fertility control implications is given in the last section of the paper.

The Model

Our analysis is exploratory in nature and is guided by a simple model. Reported intention to use a family planning method in the future is taken as an initial commitment. How many of those who intended to use will end up actually practicing in the future and how many of those who reported no intentions to practice will end up practicing in the future can neither be determined nor analyzed from the existing data. Follow-up surveys are required to evaluate and understand the predictive value of intentions and answer such questions as which group of people change their intentions and why. Our concern, accordingly, will be to understand the forces that motivate some wives to indicate their intentions to use a family planning method in the future. There are three sets of forces that could have such influence :

1. Fecundity factors that influence the perceived need to use any method to control fertility,
2. Demand factors such as the perceived burden of an additional pregnancy whether economic, social or psychological, including the disutility of preventing the pregnancy, and

3. Supply factors that influence the perceived availability and cost of the means of family planning.

We first attempt to examine the influence of the fecundity related variables, and second we analyze the unexplained (individual) variance against a set of variables that represent demand and supply factors. This is done by using a multivariate technique that assumes no additivity and allows for interaction (see [4; 10; 11]).

Fecundity and Intentions to Use for Rural Residents

The following variables were introduced in the first stage of the multivariate analysis as indicators of a woman's level of fecundity. They are listed in order of their relative importance in explaining the variance of the dependent variable (Intention to use a family planning method in the future) if used to make a single division of the whole sample of rural wives.

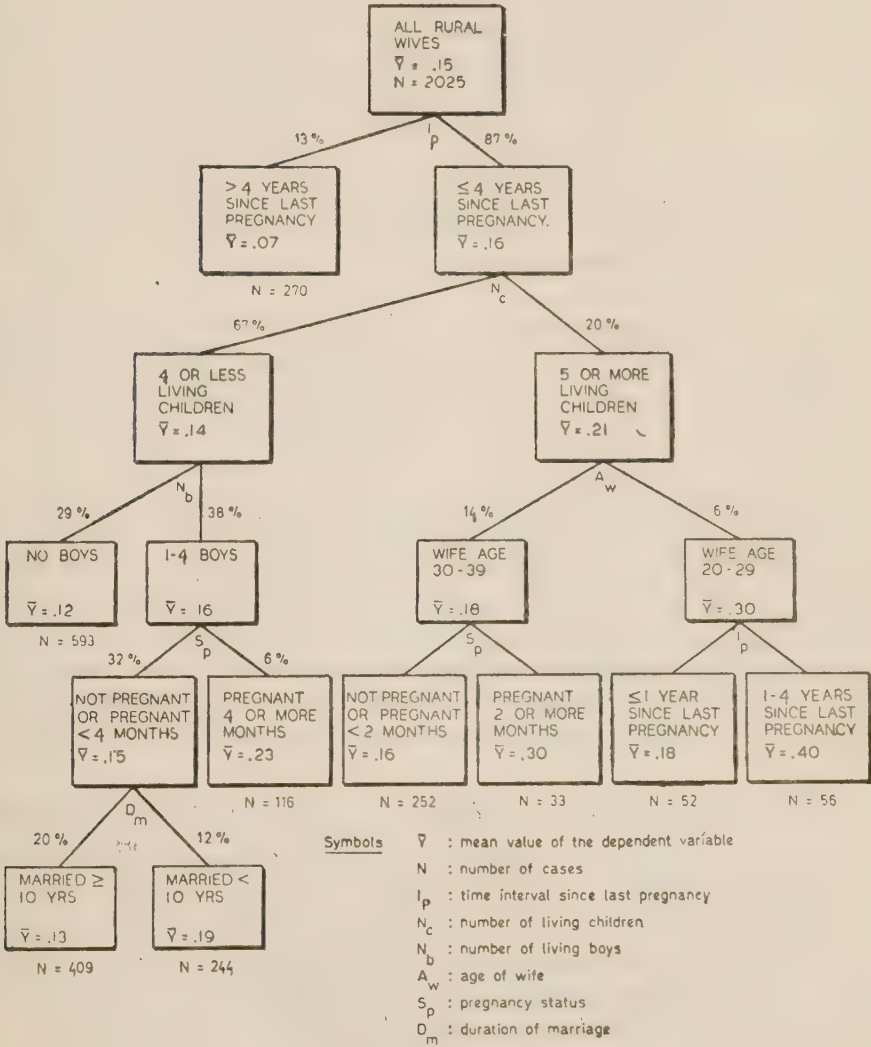
- * Time interval since last pregnancy
- * Number of living children
- * Number of living boys
- Age of youngest child
- * Pregnancy status
- * Duration of marriage
- * Age of wife

Asterisked variables are those actually used in Figure 3. They together explained 3.2 per cent of the variance in the dependent variable.

The analysis is done separately for rural and for urban women under 40 years of age who were not using a method of family planning at the time of interview. Future use of family planning is clearly not of much relevance to women over 40. The reason for excluding current users is that they were not asked about their future intentions. Their number, however, is very small and will not affect the general conclusions. The findings for the rural population are illustrated in Figure 3. Fifteen per cent of rural Bangladesh wives under 40 who were not currently practicing indicated intentions to use some method in the future. However, for those wives (13 per cent of total) who did not have a pregnancy during the last four years only seven per cent of them indicated such intentions. This is clearly related to their perceived assessment of their low fecundity. No other explanatory variable used in the analysis seems important enough to divide this group further. For the remaining 87 per cent of wives who had at least one pregnancy during the previous

FIGURE 3

ANALYSIS OF INTENTIONS TO USE FAMILY PLANNING IN THE FUTURE
FOR RURAL BANGLADESH
CURRENTLY MARRIED WOMEN, LESS THAN 40 YEARS OLD, EXCLUDING CURRENT USERS
(2025 CASES OUT OF 2518 INTERVIEWED)



four years, it was the number of living children that made the most difference with respect to their intended future use. The proportion with future intentions was 21 per cent for those with five or more children as opposed to 14 per cent for those less than five children (two-thirds of all wives). Living children is partly an indication of high fertility (given duration of and age at marriage) and partly an indication of economic pressure and motivation to control family size. Both forces, however, reinforce each other. Age as a reflection of decreasing fecundity was an important discriminator of future intentions among these high fertility, high parity women. For those 30-39 years old, future intention to use was only 18 per cent compared with 30 per cent for the younger women 20-29 years old. But among the older women intention to use in the future increased to 30 per cent if the women were at least two months pregnant. This finding could support the logic of a postpartum family planning programme.

For the larger group of women with four or less children, parity and pregnancy status played an important role. If a woman had at least one boy and was currently four months or more pregnant, the probability of her intending to use increased from 14 to 23 per cent.

The findings of the first stage analysis of intentions to use family planning methods clearly indicate that the responses to the questions on intentions were based on a rational decision process. Future use seems of relevance for those who perceived themselves at higher risk of pregnancy especially if combined with a family size approaching the norm of completed family size in Bangladesh. We turn now to examine the effect of the more direct demand and supply indicators on wives' reported intentions after taking account of the effect of fecundity related variables.

Demand and Supply Factors and Residual Analysis for Rural Residents

For each woman in each end group of Figure 3 there is an unexplained residual "error" (her actual minus her expected value on the variable intended future use, as indicated by the group average to which she belongs). This residual is calculated for each observation and the total individual residual scores are pooled together to form a new dependent variable, the mean of which will be equal to zero.

The following variables were used in the second stage analysis. They are listed below in order of their relative importance in explaining residual variance if used to make a single division of the whole sample,

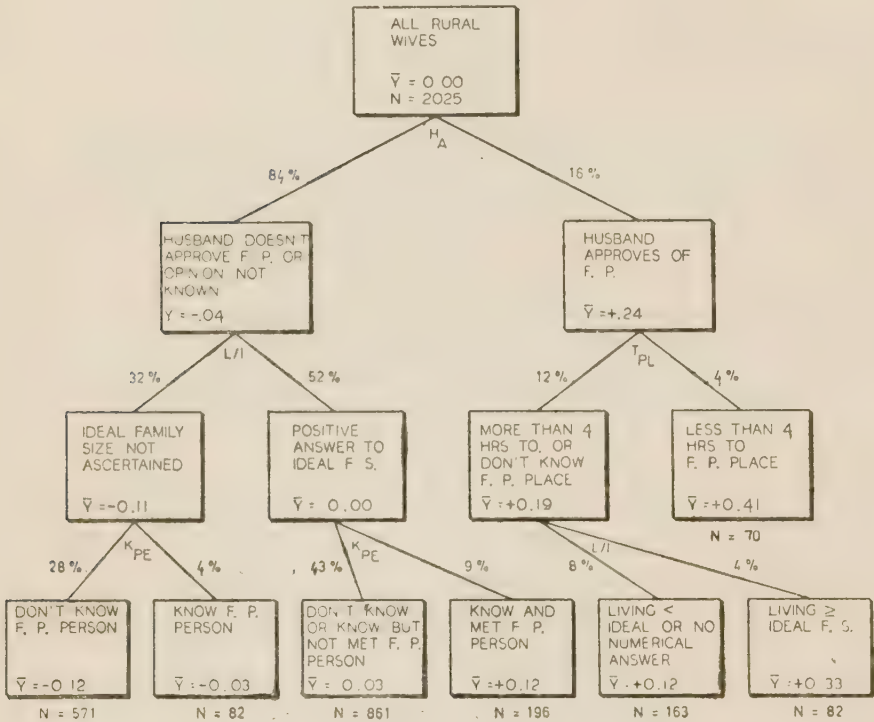
- * Husband's approval/disapproval of family planning
- * The number of living children relative to ideal family size
- * Whether the wife has met a family planning person
Whether the wife knows of another needing family planning
Whether more children are desired
Whether the wife knows a family planning place
- * The time required to go to a family planning place

Asterisked variables are those actually used in Figure 4. They together explained 15.0 per cent of the residual variance.

The findings of the residual analysis are illustrated in Figure 4. The strength of husbands' opinions about family planning on wives reported intentions to practice is clearly illustrated in this analysis. The probability that a wife intended to use in the future increased by 24 per cent if she reported that her husband approved of family planning while the probability declined by four per cent if he did not approve. These findings should be analyzed with reference to Figure 3. For example, of the group of women at the right hand bottom of Figure 3 (age 20-29, with five or more children and with at least one pregnancy outcome one to four years ago) 40 per cent of them indicated intention to use a family planning method in the future. However, if the husband also approved of family planning, the probability increased to 64 per cent and declined to 36 per cent if the husband disapproved. There were not many husbands, however, who were reported to have approved of family planning: only 16 per cent of the rural couples were reported to have such an opinion. And it seems that not many of their wives had easy access to family planning places. It is evident that the low cost of availability of services in terms of distance was another important factor. For 25 per cent of the group of wives whose husbands approved of family planning, it would have taken less than four hours to reach a family planning place and that was enough incentive to increase the probability of future use from 24 to 41 per cent as compared to a decline to 19 per cent for those who would have spent more than four hours travelling or did not know where to go for family planning service. Effective availability was clearly a bottleneck for this important group of rural couples whose values seem to have permitted some positive action. And for those apparently motivated wives (12 per cent of all wives) who either did not know about a family planning place or for whom it would have taken more than four hours to reach such a place, the probability of intended future use increased from 19 to 33 per cent if the couple had reached or exceeded their ideal family size.

FIGURE 4

AND ANALYSIS OF POOLED RESIDUALS OF END GROUPS IN FIGURE 3
FOR RURAL BANGLADESH
CURRENTLY MARRIED WOMEN, LESS THAN 40 YEARS OLD, EXCLUDING CURRENT USERS
(2025 CASES OUT OF 2518 INTERVIEWED)



Symbols:

\bar{Y} : mean value of the dependent variable

N : number of cases

H_A : husband's approval/disapproval of family planning

L/I : number of living children relative to ideal

T_{PL} : time to go to family planning place

K_{PE} : whether wife knows a family planning person

We now turn to the majority of wives (84 per cent) whose husbands did not approve of family planning or who did not know their husband's opinion. The important factor affecting their future intentions appears to have been whether the wife had a deterministic attitude as indicated by her answer to the question on ideal family size. If she had a deterministic attitude, then indicators of supply availability, as for example whether she knew or had met a family planning person, seem to have had a clear positive effect on future intentions. Even those wives whose husbands opposed family planning (or with unknown opinions) and who were without a deterministic attitude seem to have been positively responsive to the supply availability—the knowledge of a family planning person increased the probability of future intentions to practice a family planning method.

Analysis for Urban Residents

The findings for the urban residents are presented in Figures 5 and 6. The same variables were used as for the rural sample in both stages of analysis. As before, the variables are listed in order of their importance in terms of variance explained if used to make a single division of the whole sample of urban wives.

First stage variables :

- | | |
|--------------------------------------|------------------------|
| * Age of youngest child | * Pregnancy status |
| * Time interval since last pregnancy | * Age of wife |
| * Number of living children | * Duration of marriage |
| Number of living boys | |

Asterisked variables are those actually used in Figure 5. They together explained 9.1 per cent of the variance.

Second stage variables :

- * Whether wife knows of another needing family planning,
- * Husband's approval/disapproval of family planning
- * The number of living children relative to ideal family size
- * Whether more children are desired

The time required to go to a family planning place

Whether the wife knows a family planning place

Whether the wife has met a family planning person

Asterisked variables are those actually used in Figure 6. They together explained 17.6 per cent of the residual variance.

FIGURE 5

AID ANALYSIS OF INTENTIONS TO USE FAMILY PLANNING IN THE FUTURE
FOR URBAN BANGLADESH
CURRENTLY MARRIED WOMEN, LESS THAN 40 YEARS OLD, EXCLUDING CURRENT USERS
(450 OUT OF 570 INTERVIEWED)

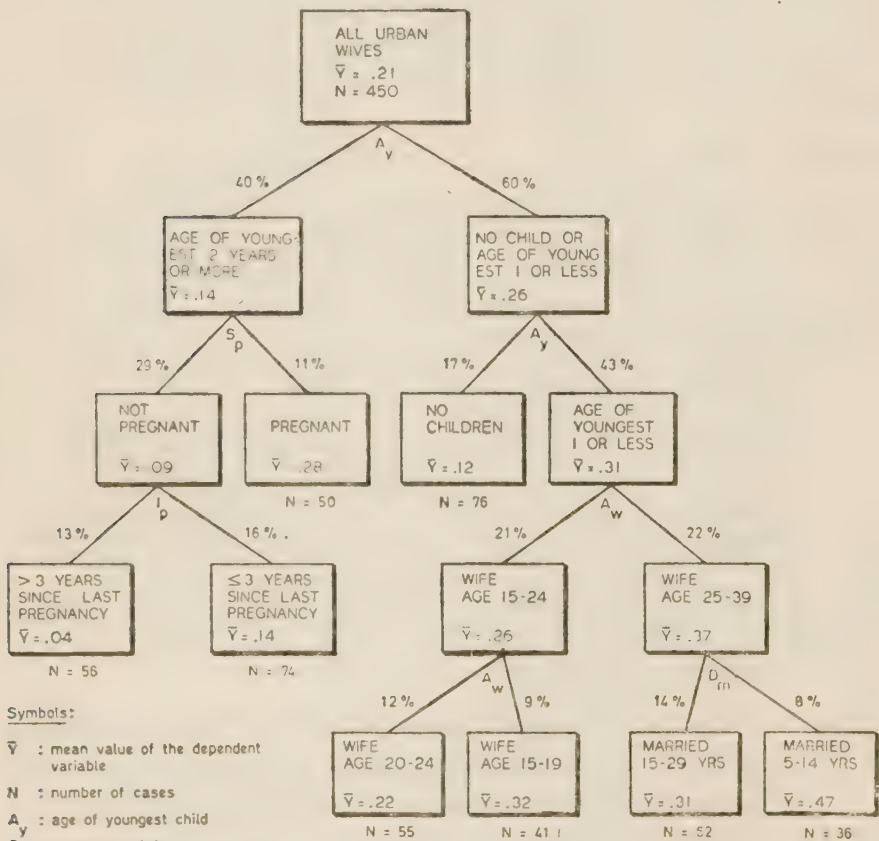
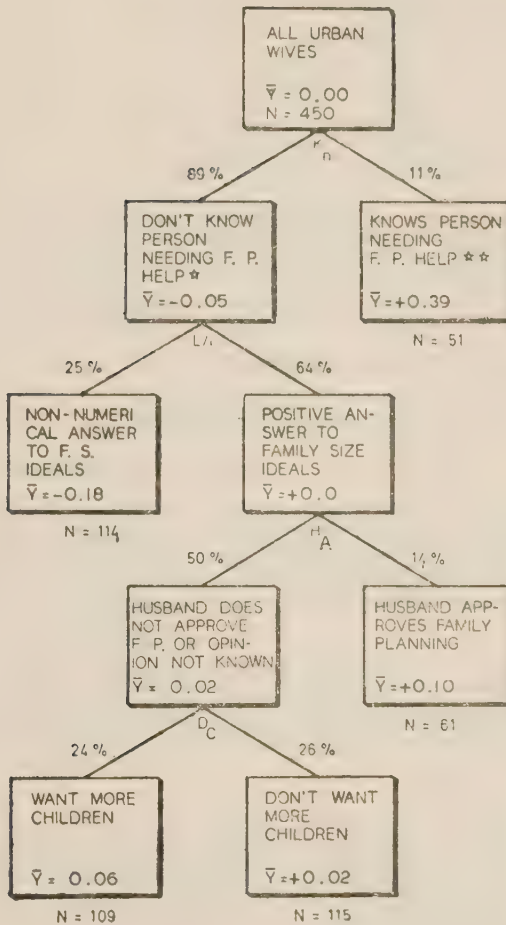


FIGURE 6

AID ANALYSIS OF POOLED RESIDUALS OF END GROUPS IN FIGURE 5
FOR URBAN BANGLADESH
CURRENTLY MARRIED WOMEN, LESS THAN 40 YEARS OLD, EXCLUDING CURRENT USERS
(450 OUT OF 570 INTERVIEWED)



Symbols:

- \bar{Y} : mean value of the dependent variable
- N : number of cases
- K_n : whether wife knows person needing family planning help
- L/I : number of living children relative to ideal
- H_A : husband's approval/disapproval of family planning
- D_C : whether wife desires more children

- ☆ or knows those who need for health or other reasons
- ☆☆ for economic or "family planning" reasons

The general pattern is similar to the rural analysis but with higher averages, as expected. For example, as illustrated in Figure 5, a wife who married 5-14 years before the interview, who was between 25 and 39 years old and with the age of her youngest child one year old or less, the probability that she would use in the future was 47 per cent as opposed to 12 per cent for a woman without children and 4 per cent for a non-pregnant wife who was at least 4 years without a pregnancy. Looking to the second stage residual analysis in Figure 6, it seems that supply availability was not as important a bottleneck in urban areas as were cultural and motivational factors. If family planning was an acceptable behaviour to the wife, as indicated by her knowledge of a person who needed family planning help or advice, the probability of her future intended use increased by 39 per cent.

These findings do not imply that supply availability did not have a positive effect in urban areas; it did, but its effect was overshadowed by motivational and cultural factors. This is a plausible finding since in urban areas distances are bound to be shorter and knowledge about availability was more common than in rural areas.

VI. SUMMARY AND DISCUSSION

In this paper we examined the response of Bangladesh wives as of 1968/69 to the National Family Planning Programme inputs. It is evident that there were constraints on both the availability of services and the level of demand. The findings clearly indicate that even among the few who did not have serious cultural constraints in terms of practicing some method of birth control, the necessary knowledge for effective use was lacking. The programme with its relatively large inputs did not reach all the target couples whose need for family planning seems to have been immediate although the demographic impact of their use may not have been sizeable.

There was a larger reserve of future intentions that were also highly related to programme inputs. The important point, however, is that even if we take all current use and expected future use, based on reported intentions, this total expected demand was, and is not large enough to generate the desired fertility reductions in Bangladesh.

It is evident that the real bottleneck is the generation of demand. Serious efforts that go beyond family planning and that exercise more critically the cultural and environmental factors that determine family size and fertility behaviour are clearly needed in Bangladesh. The First

Five Year Plan of Bangladesh does recognize this point calls for "bold, and if necessary, drastic policies" [7, p. 537] for reducing the high rate of population growth. The development and implementation of effective population policy and programmes will be an issue of critical importance for the future of Bangladesh. The success or failure of Bangladesh to realize "bold" and "drastic" population policies and the effect which they have on population growth will be closely watched by all nations of the world.

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Money and Inflation in Bangladesh

by

A. K. M. SIDDIQUE*

I. INTRODUCTION

The Bangladesh economy has been plagued by inflation almost from its birth. No precise estimate of the extent of inflation is possible because of the poor state of price statistics. No GNP deflator is available. The Consumer Price Index for Industrial Workers at Narayanganj (the biggest industrial centre) moved up from 126 (1969 70 = 100) in January 1972 to 298 in March 1974 — an increase of 137 per cent in 27 months giving an annual rate of 61%.¹ The middle class cost of living index at Dacca (1955/56 = 100) rose from 211 in January 1972 to 425 in September 1973 — an annual rate of 58%. In the absence of a better index, the above two indices may be regarded as rough and ready indicators of the rate of inflation in Bangladesh. There has been one systematic study of this problem by Swadesh R. Bose [5, pp. 243-269]. Bose's study did not attempt any quantitative analysis of the relationship between money supply and the price level. Besides, it covered a period of one year only after the independence of Bangladesh. Since January 1973 important changes in the sources of monetary expansion have taken place. It is also possible that velocity of circulation of money has changed significantly during the period. It may, therefore, be interesting and useful to analyse the monetary aspects of the inflation more thoroughly particularly to see if velocity has been changing. After this introductory section, in the next section of the paper it is proposed to examine by econometric technique the relationship between money supply and price level. The third section will deal with the components of money supply both narrowly and broadly defined—with special reference to substitution, if any, among the various monetary assets. The fourth section will bring out the sources of monetary expansion, and in the final section, an attempt will be made to draw policy conclusions.

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¹ Bangladesh Bureau of Statistics, Dacca. The Index has been computed on the assumption that 90% of rice purchases by workers are from the open market.

II. MONEY SUPPLY AND THE PRICE LEVEL

If availability of goods and services remain unchanged and the velocity of circulation of money is also unaltered, one should then expect, in terms of the quantity theory of money, a rise in price level proportionate to the rise in money supply. It is interesting to see what has actually happened in Bangladesh during the period January 1972 to March 1974. The following table sets out changes in the money supply and the price

TABLE I
INCREASES IN MONEY SUPPLY AND THE PRICE LEVEL

Period	%Increase in Money Supply	%Increase in Price Level
Half Year Ended :		
June 1972	22	24
December 1972	40	28
June 1973	2	22
December 1973	16	12
Quarter Ended :		
March 1974	3	9
Year Ended :		
December 1972	71	59
December 1973	19	37
1974 (estimated annual rate on the basis of first quarter figures)	12	36

Source : Compiled from figures supplied by the Bangladesh Bank and the Bangladesh Bureau of Statistics.

Although half yearly figures fluctuated considerably, for the year 1972 as a whole, the rate of increase in the price level (59%) was much slower than that of money supply (71%). Total goods available are estimated to have declined by 19 per cent in 1972 as compared to 1969/70 [5.p. 255]—the last normal year before the outbreak of political disturbances. But how much of the decline occurred during 1970/71 and the first half of 1971/72 is not known. This is the period which witnessed a good deal of political disturbances. The bulk of the decline in output probably occurred during this period. Agricultural production increase only 4 per cent in 1972/73 over 1971/72 and there was no

significant recovery in industrial production.² According to the Bangladesh Bureau of Statistics, there was an increase of 25 per cent in aggregate production in 1973/74. But the major rice crop of 1973/74 was harvested only in December-January, so that its impact would not be felt significantly during the period covered by the present paper. Besides, inefficient operation of the distribution channel and large scale smuggling across the borders, widely believed to have taken place (accompanied by unilateral capital transfer from Bangladesh) would have meant little improvement in availabilities. It would not, therefore, be unrealistic to assume that aggregate supply of commodities did not change significantly during the period January 1972-March 1974.

If the above assumption is correct we can test whether the velocity of circulation of money has changed during this period. In terms of the quantity theory of money the following relationship should hold :

$$P = f \{ M, M(v), T \}$$

where P = price level, M = quantity of money, $M(v)$ = velocity of circulation of money, and T = aggregate of goods and services.

If T is assumed constant,

$P = g \{ M, M(v) \}$
on theoretical ground, it is expected that,

$$\frac{dP}{dM} > 0 \quad \frac{dP}{dM(v)} > 0$$

In order to examine whether there has been any change in velocity of circulation of money in Bangladesh, we can try a regression equation of the following form :

$$P = b_1 + b_2 M + \sum_{i=1}^8 b_{2+i} MD_i + e$$

where P = the cost of living index for industrial workers at Narayanganj
 M = Money Supply (defined narrowly so as to include currency and demand deposits only. D_i is a dummy variable (1 if in quarter i ; 0 otherwise) and e = error term.

² Bangladesh Bureau of Statistics, Dacca.

With monthly figures of M and P for the period January 1972 to March 1974 and quarterly dummies, the following equation is estimated :

$$(1) P = 62.9 + 0.15M + 0.02MD_1 + 0.05MD_2 + 0.05MD_3 + 0.06MD_4 + 0.10MD_5 \\ + 0.11MD_6 + 0.12MD_7 + 0.12MD_8 \\ (1.6) \quad (1.4) \quad (2.2) \quad (1.6) \quad (1.4) \quad (2.8) \\ (2.9) \quad (2.8) \quad (2.7)$$

$$R^2 = .97 \quad D.W. = 2.1 \quad S.e.e. = 7.9 \quad F = 130$$

(Figures in parenthesis are t values)

As the R^2 (adjusted for degrees of freedom) indicates, equation (1) explains 97% of the price changes and there is no evidence of auto-correlation at 5% significance level. From this equation the velocity of circulation of money can be derived as follows :

For quarter 1, it is the coefficient of M and for subsequent quarters, the coefficient of each MD_i has to be added to the coefficient of M to get the velocity for that quarter. For example, the second quarter velocity is $(0.15+0.02=0.17)$, for the third quarter velocity is $(0.15+0.05=0.20)$ and so on. It is observed from the equation that the velocities for the last four quarters while not being significantly different from each other, are significantly different from those of the earlier quarters. It is, therefore, plausible, so far as velocity of circulation is concerned, to divide the whole period into 2 subperiod as follows :

period 1 (Quarters 1-5)

period 2 (Quarters 6-9)

on this basis the following equation is fitted :

$$(2) P = 1 + 0.30M + 0.04MC_1 \\ (15.5) \quad (6.9)$$

$$\text{where } C_1 = \begin{cases} 0 & \text{in period 1} \\ 1 & \text{in period 2} \end{cases}$$

(Figures in parenthesis are t values)

$$R^2 = .97 \quad D.W. = 1.37 \quad S.e.e. = 7.8 \quad F = 589$$

Equation (2) explains 97% of the price changes after adjustment for degree of freedom and there is no auto-correlation at 1% significance level. According to this equation velocity of circulation is 0.30 for Period 1 and 0.34 for Period 2. This means a rise of 13% in velocity in the period April 1973-March 1974 as compared to the preceding 15-month period.

It is clear, therefore, that slower monetary expansion in the last four quarters has been offset to a certain extent by a rise in velocity. But it needs to be explained why velocity remained more or less stable in the first 15 months and then changed significantly in the next 12 months

It is also remarkable that the second period experienced a lower rate of price increase as compared to the first period. It is well known that velocity changes with the rate of monetization of the subsistence sector and structural changes in the economy. It also changes with price-expectations for the future. If the first two factors were in operation velocity should have fallen. Since the regression equations do not show a fall in any of the quarters, and it is also known that there has not been any significant recovery in industrial and agricultural production, the velocity could have risen only because of inflationary expectations. But one might ask why the latter factor did not operate in the first period. It may be largely due to the fact that it takes some time before inflationary expectations are formed. It is likely that in the early months of independence people had greater confidence about price stability in the future. But as time passed without any perceptible improvement in the economic situation in general and the monetary situation in particular, there was some erosion of confidence in the currency, which perhaps led people to move out of money into other assets such as real estate, gold foreign exchange, etc. The question of asset substitution is discussed in Section III. But it must be emphasized that erosion of confidence in the currency in Bangladesh has been much less acute than in the Chinese and the Indonesian hyperinflations.³

III. COMPOSITION OF THE MONEY SUPPLY

In this section the changing composition of money supply as defined narrowly as well as broadly will be analysed. M_1 is the narrow money consisting of currency and demand deposits, while M_2 is broad money consisting of currency, demand deposits and time deposits. The following table shows the composition of narrow money :

³ For China see [8]. Campbell and Tulloch observe that in the Chinese case commodities became liquid assets. Farmers stored rice, poorer Chinese stored consumer goods and wealthier Chinese often held large quantities of U. S. dollars. For Indonesia see [1 ; 10].

TABLE II
COMPOSITION OF NARROW MONEY (M_1)

(Taka in million)

Time	Currency in Circulation	Demand Deposits*	Narrow Money (M_1)	% of (2) to (4)
(1)	(2)	(3)	(4)	(5)
December 17, 1971	2066	1809	3875	53
End of March 1972	2317	2481	4799	48
June 1972	1756	3101	4857	36
September 1972	2464	3201	5663	43
December 1972	2897	3896	6794	43
March 1973	3115	3874	6990	45
June 1973	2864	4096	6960	41
September 1973	2965	4255	7221	41
December 1973	3207	4871	8079	40
March 1974	3484	4803	8288	42

* Excludes interbank deposits.

Source : *Bangladesh Bank Bulletins*.

The preceding table brings out the declining share of currency in money supply (M_1) from 53 per cent on the eve of Independence to 42 per cent in March 1974. There has been considerable fluctuation in the intervening period, but the downward trend is unmistakable. Since demand deposits earn no interest and growth of banking habit takes place normally over a longer period, this kind of asset-substitution must be due to special reasons. Several factors can be cited as explanations of this trend. First, the size of the major cash crop—jute—and its price often act as important determinants of the volume of currency in circulation as most of the jute growers do not have banking habits and demand payment in currency. Since independence, the size of the jute crop has declined persistently and prices received by the jute grower have also remained depressed. As compared to 7.2 million bales in 1969/70, the crop was estimated by non-official sources at 5.5 million bales in 1973/74, and at 4.5 million bales in 1974/75. Secondly, money income has been redistributed in favour of the trading classes in the post-independence period because of large profit margins in commodity and real estate speculation, black marketing, smuggling etc. These people, by and large, have banking habit, and in the absence of opportunities of long term investment, have kept the newly acquired funds in liquid demand deposit accounts. Finally, fear of robbery may have forced people to keep funds with banks. Of course, one should expect these funds to go into interest

bearing deposits. An explanation of this must await the examination of the share of time deposits in money supply broadly defined as well as its proportion in total deposits (demand + time). The following table gives the relevant figures.

TABLE III
COMPOSITION OF BROAD MONEY (M_2)

(Taka in million)

Time	Time Deposits*	Broad Money (M_2)	% of (2)to(3)	Total Deposits (2)to(5)	% of (2)to(5)
(1)	(2)	(3)	(4)	(5)	(6)
December 17, 1971	1585	5460	29	3394	47
End of March 1972	1743	6543	27	4225	41
June 1972	2135	6993	31	5236	41
September 1972	2421	8080	30	5623	43
December 1972	2546	9341	27	6443	40
March 1973	2818	9808	29	6693	42
June 1973	2930	9891	30	7026	42
September 1973	3177	10398	31	7432	43
December 1973	3444	11524	30	8316	41
March 1974	3643	11931	31	8447	43

* Excludes interbank time deposits.

Source : *Bangladesh Bank Bulletins*.

It would appear from Table III that while time deposits have grown at the expense of currency it has lost ground to demand deposits. The share of time deposits in total deposits came down from 47 per cent on the eve of independence to 41 per cent in March 1972 and fluctuated thereafter in the range of 40 per cent to 43 per cent. Can rational principle of portfolio choice explain this? It is likely that because of political and economic uncertainty depositors preferred liquidity to yield. Besides, interest rate of 4 per cent—7 per cent in face of annual rate of inflation of 60 per cent or so—can not mean much.

In an inflationary situation such as this where yield on financial assets is negative, one should normally expect substitution in favour of real assets, (e.g., real estate, gold, foreign exchange, commodities etc.). Has this happened in Bangladesh? There is no conclusive evidence on this question. Some fragmentary evidence is presented in Table IV.

TABLE IV
REAL STOCK OF MONETARY ASSETS*

(Taka in million)

Date	C	DD	TD	MA
(1)	(2)	(3)	(4)	(5)
December 17, 1971	16.39	14.35	12.5	43.3
March 31, 1973	14.35	17.85	12.9	45.1
March 31, 1974	11.69	16.11	12.2	40.0
Increase(+)/ Decrease(-)	-4.70	+1.76	-0.3	-3.30

* Deflated by the Cost of Living Index for industrial workers at Narayanganj.

C = Currency in circulation ; DD= Demand deposits ; TD = Time deposits ;

MA= Aggregate monetary assets.

Sources : Compiled from *Bangladesh Bank Bulletins* and data from Bangladesh Bureau of Statistics.

It would appear from the above table and Table III that while nominal stock of monetary assets have recorded a phenomenal increase, there has been a decline in real terms to the extent of 8 per cent. Decline in currency was large—28 per cent, but time deposits declined by 2 per cent only and these were partly offset by an increase of 12 per cent in demand deposits. But even the latter recorded a decline in real terms between March 31, 1973 and March 31, 1974. Although in the absence of any statistics on other financial asset holding and total asset holding no conclusion can be drawn about asset-substitution, the staggering rise in the price of gold (roughly 350%) and real estate (300%) during January 1972-March 1974 would suggest that people are bidding up their prices by trying to move into these assets. But the very fact that demand deposits have increased by 12% and time deposits have declined only marginally in real terms is significant in face of the high negative yield on them. Is it because suitable real assets are not available in sufficient quantities? Again, no clear answer is possible because of the absence of data. But it may be interesting to examine the ownership of deposits in our search for motives of holding these deposits.

The following table shows that increased holding of demand deposits is explained largely by the government and "other public corporations etc.", particularly the later whose share went up from 8.24% in January 1973 to 13.84% in December 1973. It is also significant that the share of the private sector has gone down from 67.35% to 60.75% over the same period. As the government was running a large budgetary deficit, the increase in demand deposits on government account must be purely of a

TABLE V
OWNERSHIP OF DEMAND DEPOSITS

(Per cent)

Sectors	End January 1973	End December 1973
Public Sector	32.08	38.43
Government	12.71	14.50
Nationalized Industries	9.66	8.53
Other Public Corporations	8.24	13.84
Local and Municipal Bodies	1.46	1.56
Cooperative Sector	0.57	0.82
Private Sector	67.35	60.75
Companies	9.51	7.65
Business Enterprises	19.92	20.45
Households	24.81	25.50
Others (including nonresidents)	13.11	7.15

Sources : Bangladesh Bank, *Quarterly Banking Statistics* and *Bangladesh Bank Bulletins*.

temporary nature due to lag in disbursements. In the case of "other public corporations" underutilization of capacity due to shortage of spare parts, raw materials etc., may be important reasons for higher deposit holdings. It is also possible that on the whole the public sector agencies are less sensitive to the negative yield on deposits than the private sector agencies.

The following table again shows a sensitivity of the private sector, particularly of the household subsector to the negative yield. The share of households declined from 90% to 85% during the eleven month period ended December 1973. Since the household subsector is overwhelmingly the major holder of savings deposits, this has crucial significance for the growth of this category of deposits in the future.

IV. SOURCES OF MONETARY EXPANSION

The impact of the monetary expansion with accompanying change in velocity of circulation has been shown in Section II. It would be interesting to examine the sources of or the causative factors responsible for the monetary expansion and their changing importance over time. This would be particularly helpful in deriving policy conclusions. For convenience of analysis the whole period may be divided into three subperiods :

TABLE VI
OWNERSHIP OF SAVINGS DEPOSITS

(Per cent)

Sectors	End January 1973	End December 1973
Public Sector	4.09	6.56
Government	2.06	2.73
Nationalized Industries	0.15	0.99
Other Public Corporations	0.97	1.67
Local & Municipal Bodies	0.91	1.17
Cooperative Sector	0.86	1.42
Private Sector	95.05	92.02
Companies	0.30	0.25
Business Enterprises	2.52	3.84
Households	90.12	85.27
Others (including nonresidents)	2.11	2.66

Sources : Bangladesh Bank, *Quarterly Banking Statistics* and *Bangladesh Bank Bulletins*.

(A) December 17, 1971 to June 30, 1972

(B) June 30, 1972 to June 29, 1973

(C) June 29, 1973 to June 28, 1974

Tables VIII, IX and X bring out the changing role of the government sector, the nationalised industries sector, the private sector and the international transactions sector in causing monetary expansion. These tables also bring out a number of interesting features of the monetary expansion in Bangladesh. In the first period (December 1971-June 1972) government fiscal operations, international transactions and the nationalised sector accounted for the entire expansion. The private sector and residual items were in fact contractionary. The net decline in bank credit to the private sector was due mainly to poor investment, climate and shortage of raw materials, spare parts, etc. The expansionary effect of international transactions was entirely unexpected in view of the fact that the economy was starved of essential imports—consumer goods as well as industrial raw materials and spare parts. The unwanted export surplus was caused largely by deficiencies of the importing machinery.

TABLE VII
SOURCES OF CHANGE IN MONEY SUPPLY, 1971-72

(Taka in million)

Sources	December 17, 1971	June 30, 1972	Changes
1. Currency with the Public	2066	1756	-310
2. Demand Deposits	1809	3101	+1292
Change in Money Supply			+982
Sources :			
Expansion (+)			
Contraction (-)			
A. Net Domestic Credit			
Expansion/Contraction			-340
(i) Private Sector			-466
(ii) Nationalized Sector			+675
(iii) Change in Time Deposits			-549
B. Government Fiscal Operation			+839
C. International Transactions			+821
D. Residual Items			-338
Total from All Sources			+982

Source : Bangladesh Bank, *Selected Economic Indicators*.

TABLE VIII
SOURCES OF CHANGE IN MONEY SUPPLY, 1972-73

(Taka in million)

Sources	June 30, 1972	June 29, 1973	Changes
1. Currency with the Public	1756	2864	+1108*
2. Demand Deposits	3101	4096	+995
Change in Money Supply			+2103
Sources :			
Expansion (+)			
Contraction (-)			
A. Net Domestic Credit			
Expansion/Contraction			+727
(i) Private Sector			-190
(ii) Nationalized Sector			+1713
(iii) Change in Time Deposits			-795
B. Government Fiscal Operation			+1316
C. International Transactions			-532
D. Residual Items			+592
Total from All Sources			+2103

* Includes replacement of Pakistan Notes to the extent of Taka 640 million.

Source : Bangladesh Bank, *Selected Economic Indicators*.

TABLE IX
SOURCES OF CHANGE IN MONEY SUPPLY, 1973-74

(Taka in million)

Sources	June 29, 1973	June 28, 1974	Changes
1. Currency with the Public	2864	3309	+445
2. Demand Deposits	4096	4856	+760
Change in Money Supply			+1205
Sources :			
Expansion (+)			
Contraction (-)			
A. Net Domestic Credit			
Expansion/Contraction			+513
(i) Private Sector			+501
(ii) Nationalized Sector			+1078
(iii) Change in Time Deposits			-1066
B. Government Fiscal Operation			+1439
C. International Transactions			-1136
D. Residual Items			+390
Total from All Sources			+1205

Source : Bangladesh Bank, *Selected Economic Indicators*.

The vacuum left by Pakistani importers could be filled by government agencies and indigenous private importers only slowly. Import licensing procedures were also not entirely satisfactory. The deficit in government fiscal operations was caused by a low realization of tax revenue on the one hand and the huge and unavoidable expenditures on relief and rehabilitation in the aftermath of the war of independence on the other. But the very large expansion of credit to the nationalized sector is more difficult to explain since increases in wages and raw material prices to the extent of 20-25% would not require such enormous amounts. A sharp fall in productivity and meeting operational losses with bank credit are the apparent reasons for this. The jute mills are mainly responsible for this as other industries showed a small net profit as can be seen from Table X. Of the total bank credit outstanding to manufacturers as on December 13, 1973, 64% was claimed by the jute mills.

In the second period (July 1972—June 1973) the nationalized sector was by far the most expansionary, followed by government fiscal operations and residual items. The international sector reversed its role from an export surplus to an import surplus and the private sector continued to remain contractionary although the net decline in bank credit was less than in the first period. In the third period (July 1973-

June 1974), government fiscal operations contributed more to monetary expansion than the nationalized industries, but both continued to be predominantly expansionary. The private sector emerged for the first time as a net expansionary force and international transactions became more contractionary with the import surplus doubling itself.

A noteworthy feature of the enormous net borrowings of the government and the rationalized sectors was that in real terms these were 24% less in the first period, about 57% less in the second period, and roughly 40% less in the third period (as deflated by the cost of living index).

It is somewhat encouraging to note that the nationalized sector was able to reduce its net borrowing in the third period because of improvement in performance of most of the industries. The following table shows the financial position of nine nationalized industries.

TABLE X
FINANCIAL RESULTS OF THE NATIONALIZED INDUSTRIES

(Taka in million)

Corporations	Profit(+)/Loss(-)	Profit(+) Loss(-)
	1972/73	1973/74
Bangladesh Textile Industries	+100.0	+79.0
Bangladesh Sugar Mills	-37.3	+39.0
Bangladesh Steel Mills	-25.6	+19.2
Bangladesh Paper & Board	-33.5	-28.7
Bangladesh Engineering and Shipbuilding	+7.5	+25.0
Bangladesh Fertilizer, Chemical & Pharmaceutical	+15.0	+80.5
Bangladesh Food & Allied Industries	+15.0	+25.7
Bangladesh Forest Industries Development	+5.5	+31.1
Bangladesh Tanneries	-9.4	-1.1
Total	+37.2	+269.7

Source : Bangladesh Government, Ministry of Industries, *Nationalized Industries*, Dacca, 1974, p. 8.

The above table does not include the Jute Industries Corporation, which is known to have incurred losses. Despite the small improvement, these industries as a whole are earning negative rates of return in real terms on capital invested. In preindependence period there was very small net credit expansion on their account. Most of these industries have not yet recovered the 1969/70 level of production, the notable exceptions

being Steel Mills Corporation, Engineering and Shipbuilding Corporation, Fertilizer Chemical and Pharmaceutical Corporation.

The deficit in government fiscal operations showed continued deterioration as realized revenues fell far short of expectations, while expenditures exceeded budgeted amounts. Because of slow recovery in production, the tax base remained small. Heavy reliance on indirect taxes, the weakness of tax administration and perhaps the diversion of exports and imports into unauthorized channels aggravated the deficit in fiscal operations. Besides, the purchasing power of tax receipts declined by roughly 137% in the course of 27 months covered by this study.

The behaviour of the international transactions sector is remarkable because it exercised considerable dampening influence on money supply in the second and the third period. From July 1972 to March 1974 it offset credit expansion to the extent of Taka 1668 million. Its contractionary impact was most pronounced in the third period (July 1973-March 1974). The fact that money supply increased at a much slower rate of 17% only during this period as compared to 43% in the previous period (July 1972-June 1973) was entirely due to the offsetting effect of this sector and the increase of time deposits (which are excluded from the narrow definition of money. If international transactions had remained neutral, other factors remaining the same monetary expansion would have been 34%. But this slow down in monetary expansion was achieved at the cost of running down foreign exchange reserves to a very low level of Taka 842 million as compared to Taka 2167 million in December 1972. The balance of payments position lying behind this indicator is not at all encouraging. While exports in 1973/74 are estimated at Taka 3250 million — 5% less than the target, total imports amounted to Taka 7800 million — far in excess of what was planned. The resulting deficit of Taka 4550 million was financed by foreign aid, roughly to the extent of Taka 3000 million — the rest being met from reserves, which are reported to have come down to Taka 520 million only by July 1, 1974. This development has important implications for future monetary policy as well as economic policy in general, which will be examined in the next section.

V. IMPLICATIONS FOR POLICY

The regression results in Section II clearly indicate that there was a discrete jump in velocity of circulation of money in the period April 1973-March 1974 as compared to the preceding 5 quarters. We noted that this was probably due to inflationary expectations. Velocity can come down in the long run due to monetization of the subsistence sector and

structural change in the economy. But in the short run these will be negligible and in the present situation of Bangladesh velocity would be dominated by the state of inflationary expectations. It is true that the rise in velocity is not yet very large. But if unchecked, it might assume a cumulative character resulting in a more complete loss of confidence in the currency. Eliminating inflationary expectations should therefore be a major task of monetary and fiscal policy in Bangladesh today. It was observed in Section IV that the major expansionary forces were the government fiscal operations and the net borrowing of the nationalized industries sector, while the growth of time deposits and the import surplus financed by foreign exchange reserves and foreign loans kept the rate of monetary expansion much lower than what it would have been otherwise. The cushioning effect of the reduction of reserves will be absent in the future because the latter has already reached an extremely low level. The growth of time deposits (in nominal terms) has also slowed down considerably from a monthly rate of 5.2% in the first period (first five quarters) to 2.4% in the second period (April 1973-March 1974). And in real terms there is a small decline in the latter period as compared to a small increase in the former. If budgetary deficits and net borrowings of the nationalized sector are not reduced drastically the rate of monetary expansion will be substantially higher in the future. This will accelerate the rise in the price index, which in turn would increase inflationary expectations and the velocity of money would rise further.

Now the crucial question is how the government deficit and the borrowings of the nationalized sector could be slashed to reasonable proportions. Efforts at raising revenue receipts could be strengthened considerably. Because of high prices of rice, the income of farmers has gone up. The scarcity situation has enhanced the income of the trading classes. These sources remain largely untapped. The tax administration also needs to be strengthened. So far as the nationalized industries are concerned, we noted in Section IV that most of them are operating much below capacity. Their cost of production would come down with full capacity production. But that would require giving greater priority to the import of raw materials and spare parts. There is also room for improvement in management efficiency and in worker motivation. There is an impression that the products of the nationalized industries are underpriced. This should be examined carefully, and, if warranted, prices should be raised to the economic level. Although its immediate effect would be inflationary, the reduction in borrowings from the banking system resulting from this would exercise a salutary effect on price expectations and velocity of money.

Action along the above lines are unlikely to be adequate in curbing the rate of inflation. The growth of time deposits which has already slowed down can play an important part in slowing down monetary expansion. The interest rate policy has to be used vigorously towards this end. In July 1974 the bank rate in Bangladesh was raised from 5% to 8%. But the interest rate offered on savings and time deposits have not been raised adequately as they still remain in the range of $4\frac{1}{2}\%$ - $9\frac{1}{4}\%$, a highly negative yield in real terms. The right thing would be to offer, at least a small positive yield in real terms. This coupled with further extension of bank branches in the rural areas, manned by efficient and imaginative bank officials, would accelerate the growth of time deposits.

In reducing inflationary expectations, the adequate imports of raw materials, spare parts, and food, would play an important part. The export receipts of Bangladesh are likely to fall far short of import requirements. Generous foreign assistance would be crucial in bridging the gap. Bangladesh has certainly received very generous foreign aid for relief and rehabilitation of the war-ravaged economy. In the present struggle against inflation timely arrival of foreign funds will be extremely helpful in increasing production particularly in the manufacturing sector. The progress of the green revolution would also be facilitated by adequate imports of essential inputs such as fertilizers, pesticides and irrigation pumps.

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A Comparative Analysis of Small Scale Irrigation Systems in Bangladesh

by

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I. INTRODUCTION

Several studies have indicated that farmers using irrigation water invest more in other modern inputs, such as chemical fertilizer, insecticides, etc., and adopt a more profitable cropping pattern [18;19] than traditional systems. On the basis of these findings, the study was designed to analyse the pattern of irrigation and thereby to explore the economics of small scale irrigation systems in Bangladesh. The specific objectives of the study are :

1. To analyse and compare cropping pattern, cropping intensity, farm production, labour employment, costs and returns and resource use patterns under irrigated and nonirrigated conditions in the areas of shallow tubewells, deep tubewells and low lift pumps.
2. To estimate cost of water from alternative sources.

The data were derived from previous studies by the author in Bangladesh [10;11;12;13]. The primary data were collected from 166 farms by 3 field investigators and 2 graduate students of Bangladesh Agricultural University during the calendar year 1970. In all 24 irrigated and 22 nonirrigated farms in shallow tubewell areas of Bogra district, 41 irrigated and 19 nonirrigated farms in low lift pump areas of Jessore district and 40 irrigated and 20 nonirrigated farms in deep tubewell areas of Jessore district were selected randomly.

II. FARM SIZE AND SOURCES OF IRRIGATION

Analysis of the farm economic survey revealed the following results :

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TABLE I
AVERAGE SIZE OF FARMS—OWNED AND RENTED
(SAMPLE OF 166 FARMS)

Sources of Irrigation	(In acres)	
	Irrigated Area	Nonirrigated Area
Shallow Tubewells	9.23* (24)	5.11 (22)
Deep Tubewells	5.49* (40)	5.91 (20)
Low Lift Pumps	6.80* (41)	5.98 (19)

Note : Figures in the parenthesis indicate numbers of farms in the group.

* Includes nonirrigated land owned.

Only relatively large sized farms purchased shallow tubewell (STW) for irrigation purpose. The average size of the farms owning private shallow tubewell is 9.2 acres as compared to 5.5 acres and 6.8 acres of the farms using water under cooperative deep tubewell (DTW) and low lift pump (LLP) irrigation respectively. The tubewell farmers had nearly twice the area of other farms. Only the farms using shallow tubewell irrigation water were a significantly different size from the nonirrigated farms in any of the areas studied.

After installation of irrigation it has been observed that the most successful farmers increase their land holdings by renting or outright purchase. However, it takes some time for this process to be completed. In the LLP areas, which were irrigated five years previously, average size of irrigated farms is 14 per cent above the nonirrigated control farms. However, these LLP farms are 24 per cent larger than the more recently irrigated DTW farms. The process of increasing farm size in irrigated areas is continuing (with the concomitant problem of increasing landlessness among dispossessed small scale farmers).

III. CROPPING PATTERN

In general the irrigated farms in all areas used relatively more of their gross cropped acreage for growing rice than the nonirrigated farms. The STW farmers and the LLP farmers used about 94 per cent of the gross cropped area for rice production (Table II).

In contrast DTW irrigated farms grow rice in only 76 per cent of the gross cropped area. This was because the management of the state owned deep tubewell system was not efficient enough to supply water according to crop needs. The farmers rely on farm produce for subsistence. Consequently they were not willing to accept the risk of monoculture of a water demanding crop.

The most important departure of the irrigated farmers crop plan from traditional systems is in the inclusion of IRRI-8 and IRRI-20 (improved *boro* and *aman* rice) in the plan. High yielding rice varieties need plentiful water for growth and they are sensitive to timing of supply. Rainfed supplies are inadequate in these respects hence the nonirrigated farmers did not include these varieties in their crop plan.

Potato is at present an unimportant crop in all areas. Nevertheless STW farmers are adopting its cultivation. As might be expected, non-irrigated farmers who rely upon rainfall grow Jute and *aus* rice, while the irrigated farmers tend to grow the improved variety of rice, e.g., IRRI-8, IRRI-20, IRRI-5, etc., and some potato.

Production of sugarcane by irrigated farmers is unimportant because the opportunity cost is relatively high. Only few nonirrigated farmers grow sugarcane. The differences among farms using water from different sources in respect of use of local or improved variety rice could be due to physical availability of the seed and possibly credit.

TABLE II
CROPPING PATTERN
(PROPORTION OF GROSS CROPPED AREA)

Irrigation Type	Boro	IRRI Boro	Potato	Aus	Jute	Aman	IRRI Aman	Sugar-cane	Other
STW Irrigated	48.7	23.0	4.3	6.7	—	9.5	5.6	—	2.2
Control Non-irrigated	0.2	—	1.1	34.5	10.4	47.1	0.8	0.5	5.3
DTW Irrigated	—	26.9	—	14.7	2.2	23.1	11.3	1.0	20.8
Control Non-irrigated	—	0.7	0.2	29.0	9.4	38.5	—	2.8	19.4
LLP Irrigated	2.6	42.9	0.1	4.5	0.6	36.3	7.8	—	5.2
Control Non-irrigated	0.1	—	0.4	36.5	9.1	33.0	—	5.4	15.5

Note : IRRI-Boro and IRRI-Aman are improved varieties of rice.

IV. CROPPING INTENSITY

One simple way to explain success or failure of irrigation performance is the crop intensity. All the irrigated farms utilized the available irrigated acreage. Their cropping intensity was 24 per cent more than the non-irrigated farms of all areas (Table III).

The STW farmers' cropping intensity was 206 per cent—the highest of all the groups. This was possible, mainly due to the farmers' personal control and management of water supply. The LLP farmers' relatively low performance can be assigned to nonuse of the pumps during the months of July to December in a year. However, the national average cropping intensity is 146 per cent [4]. The nonirrigated farmers in the area are a little more progressive than the national average. Therefore the LLP area is 31 per cent above average.

TABLE III
CROPPING INTENSITY
(IN ALL AREAS, 1970)

Sources of Irrigation	(In acres)	
	Irrigated Area	Nonirrigated Area
Shallow Tubewells	206	160
Deep Tubewells	200	157
Low Lift Pumps	177	153
Average	194	157

V. AVERAGE YIELD

The average yield per acre of major crops is significantly higher on irrigated farms. For example, the nonirrigated farms in Bogra produced *boro* averaging only 18 maunds per acre whereas the irrigated farms in STW area grew 56 maunds per acre (Table IV). In Jessore there was no *boro* rice grown without irrigation.

The irrigated farms of DTW and LLP area produced an average of 42 and 46 maunds of rice per acre, respectively. The production of *aus* crop and jute was not dependant on availability of irrigation water, rather it was a function of timeliness of monsoon rainfall and various other cultural practices.

The per acre yield of *aman* crop also establishes that this crop can be profitably grown in irrigated conditions only. The irrigated *aman* crop yields more than double the yield per acre of the nonirrigated *aman*. The LLP farmers obtained the highest production of *aman* rice compared with the other irrigated farmers. This may be due to better seeds, better timing of application of fertilizer, better weather or some unknown factors. However, it was a marginal gain and this variation is to be expected in a situation of immense uncertainty and innumerable unknown variables.

The production of wheat and potato is gaining importance in the irrigated areas. LLP farmers used irrigation water and sometimes other modern inputs to grow potato and averaged 200 maunds per acre. This is very dramatic improvement over the traditional farming performance.

TABLE IV
AVERAGE YIELD PER ACRE OF MAJOR CROPS

(In maunds)

Irrigation Type	Boro Rice	Aus Rice	Aman Rice	Jute	Potato	Wheat
STW Irrigated	56	15	44	12	59	45
Control Nonirrigated	18	13	17	10	48	—
DTW Irrigated	43	23	37	20	—	41
Control Nonirrigated	—	22	20	13	31	22
LLP Irrigated	46	21	52	13	200	30
Control Nonirrigated	—	19	18	13	94	—

Note : 1 maund = 82 lbs.

VI. FERTILIZER USE

Irrigated farms in all areas used on average 107 maunds of traditional manure (cow dung) per acre which is 95 per cent more than that used by the nonirrigated farms (Table V). The irrigated farms showed even more progressiveness in the use of commercial fertilizer. They used 2.7 maunds of commercial fertilizer per acre which is 182 per cent higher than that used by the nonirrigated farms.

DTW and LLP irrigated farms used about same quantity of commercial fertilizer but the STW irrigated farms applied 22 per cent more fertilizer than that used by DTW or LLP irrigated farms.

TABLE V
USE OF FERTILIZER PER ACRE

Irrigation Type	Traditional Manure	(In maunds) Commercial Fertilizer
STW Irrigated	102	3.09
Control Nonirrigated	73	.62
DTW Irrigated	142	2.54
Control Nonirrigated	57	1.95
LLP Irrigated	77	2.50
Control Nonirrigated	35	.39

Note: 1 maund = 82 lbs.

VII. USE OF LABOUR AND EMPLOYMENT

One of the major objectives of developing nations is to provide productive employment to the unemployed or under-employed masses. Attainment of these objectives will depend, to a great extent, on the pace of development activities and on the choice of technology. Small scale irrigation will help attain this objective as it requires relatively low rate of capital investment but it creates employment opportunities within agriculture.

On average, an irrigated acreage in the sample area required 1,590 man hours per annum for crop production compared to only 1,029 required by the nonirrigated acreage (Table VI). In other words, small scale irrigation can increase labour employment potential by about 54 per cent. Among the irrigated groups, the shallow tubewell farmers used labour most intensively. This is a very important finding and substantiates a previous study in India by T.V. Moorti [18].

TABLE VI
USE OF LABOUR HOURS PER ACRE

Irrigation Type	Family	Hired	Total
STW Irrigated	636 (34)	1214 (66)	1850 (100)
Control Nonirrigated	402 (40)	596 (60)	998 (100)
DTW Irrigated	466 (34)	894 (66)	1360 (100)
Control Nonirrigated	362 (34)	706 (66)	1068 (100)
LLP Irrigated	550 (35)	1010 (65)	1560 (100)
Nonirrigated	412 (40)	610 (60)	1022 (100)

Note: Conversion ratio 1 man = 2 women = 3 children.

Two key points emerge, firstly, the family labour of the irrigated farms worked 40 per cent more than the family labourers in the non-irrigated farms, assuming same family labour situation. Secondly, the irrigated farms employed 63 per cent more hired labour than the non-irrigated farms.

These studies have also shown that irrigated farms and nonirrigated farms differed greatly in the level of use of other modern inputs including insecticides and institutional credit [10;11;12]. Irrigated farmers have easier access to these inputs than the nonirrigated farmers.

VIII. COSTS AND RETURNS

Average costs and returns figures per acre do not indicate a uniform result between various sources of irrigation. A definite difference is found between irrigated and nonirrigated conditions. The gross value product per acre of deep tubewell irrigated, shallow tubewell irrigated and low lift pump irrigated farms, was Taka 932, Taka 783 and Taka 1507, respectively, whereas the net profit was Taka 123, Taka 256 and Taka 522 respectively (Table VII). The per acre net cost of production also varied greatly and were Taka 802, Taka 526 and Taka 984, respectively, in DTW irrigated, STW irrigated and LLP irrigated farms. The LLP farms made the highest profit and DTW irrigated farms made the least profit. The similar trend was found among the nonirrigated farmers also.

TABLE VII
AVERAGE COST AND RETURN PER CROPPED ACRE IN THE
PRODUCTION OF CROPS

Sources of Irrigation	(In Taka)	
	Irrigated	Nonirrigated
Deep Tubewell		
Gross Value Product	932	648
Net Cost	802	691
Profit or Loss	123	-42
Shallow Tubewell		
Gross Value Product	783	488
Net Cost	526	477
Profit	256	11
Low Lift Pump		
Net Cost	984	493
Profit	522	74

Note: 1 Taka = £ .05

Table VIII illustrates that the initial investment for a low lift pump is about double and for the deep tubewell about nine times the initial investment required by a shallow tubewell. This is one of the reasons why no private farmers own a deep tubewell or a low lift pump.

Another interesting point to note is that the fixed cost of shallow tubewell accounts for one half of the total cost whereas the fixed cost of deep tubewell and low lift pumps constitute about three-fourths of the total cost.

The shallow tubewell irrigation costs Taka 34 per 1000 cubic metres of water which is the lowest. The deep tubewell irrigation and low lift pump irrigation costs Taka 55 and Taka 47 respectively per 1000 cubic metres of water. The study could not consider the loss of water due to seepage etc., during application and costs in respect of illegal payments to the operator of deep tubewell and low lift pump. It was reported by many farmers that water loss was heavy when the canal was not "pucca" and was at a distance. Such wastage was reported to be minimal for the shallow tubewell. If water loss and associated costs could be properly computed, the costs of water for deep tubewell irrigation would have increased further.

The average area irrigated per cusec capacity indicates a rough measure of performance of the irrigation systems. The shallow tubewells, having much less capacity, did well by irrigating 9.75 acres per cusec (Table IX). Deep tubewells and low lift pumps were not efficient. It was found that they needed much more attention in respect of management and operation.

TABLE VIII
COMPARISON OF VARIOUS COMPONENTS OF COSTS
FOR DIFFERENT SOURCES OF IRRIGATION

Components of Costs	(In Taka)		
	Shallow Tubewell	Deep Tubewell	Low Lift Pump
Initial Investment			
Equipment & Civil Works	5.650	48.000	10.000
Annual Costs			
Fixed Costs	1.488 (50)	6.519 (72)	2.800 (76)
Variable Costs	1.516 (50)	2.570 (28)	864 (24)
Total Costs	3.005 (100)	9.089 (100)	3 664 (100)
Costs of Water			
1000 Cubic Metre	34	55	47

Note: The Figures in the parenthesis indicate proportion to total costs.

TABLE IX
COMPARISON OF THE PHYSICAL PERFORMANCE BY THE
DIFFERENT IRRIGATION WELLS AND PUMPS

Physical Performance	Shallow Tubewell	Deep Tubewell	Low Lift Pump
Number of Pumps/Wells	23	3	10
Total Cusec Capacity	13.2	6.0	16.0
Average Cusec Per Well/Pump	0.6	2.0	1.6
Total Area Irrigated (in acres)	129.2	131.4	113.0
Average Area Irrigated Per Well/ Pump (in acres)	5.6	43.8	11.3
Average Area Irrigated Per Cusec Capacity (in acres)	9.7	21.9	7.0
% Utilisation	26.0	17.0	13.0

IX. CONCLUSION

The findings suggest that at the existing level of capacity utilization the shallow tube well irrigation is relatively more efficient. However, further studies are recommended to determine the profitability of investments at various levels of capacity utilization. Economic evaluation of investments in alternative projects is also suggested. A dynamic approach to the investment appraisal needs to be initiated.

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A Study of Oral Pill Acceptors of the Bangladesh Postpartum Family Planning Programme

by

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I. INTRODUCTION

This paper presents the results of the first in a series of studies of contraceptive methods and acceptors in the Bangladesh Postpartum Family Planning Programme. In the study reported here, national statistics of the Postpartum Programme (1971-73) are analyzed. From a sample of randomly selected clinic records the characteristics of acceptors are identified and clinic continuation rates are computed. In addition, some preliminary findings of a pilot field follow-up study are reported.

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In collaboration with the Johns Hopkins Fertility Research Programme, the next study to be undertaken in this series will involve a longitudinal study of postpartum pill acceptors to determine use-effectiveness, causes of drop-out, and side-effects.

There are several reasons why research on oral contraceptives in Bangladesh is particularly appropriate at this time. Firstly, over two-thirds of all postpartum acceptors in Bangladesh are selecting pills as their first method of choice. The effectiveness of the Postpartum Programme in averting births, therefore, is heavily dependent upon the continuation and efficacy of oral contraception among clinic clients. Secondly, as reflected by the statistics of the national family planning programme, this preference appears to be a nationwide trend as well. While the number of acceptors of other methods in recent years either has declined (IUD) or has stabilized (conventionals), oral contraceptives have witnessed a marked increase in demand [2]. In the second half of 1971, for example, when pills were first introduced, the national family planning programme distributed about 10,000 cycles. The number of cycles distributed increased to 67, 777 in 1972 and the corresponding figure for 1973 was 211,024, a three-fold increase compared to 1972.

The Bangladesh First Five Year Plan, 1973-78, [3] recognizing the trend stated that "oral contraceptives have rapidly gained popularity in Bangladesh." The Plan explicitly considered pills as a major new contraceptive method and specifically targeted 20 to 25 per cent of all births to be averted during the plan period by oral contraception.

Despite this increased reliance upon oral contraception, our knowledge of the experience of pill use among Bangalee women is remarkably inadequate. The study reported here and the prospective study to be undertaken later represent two of the very few research efforts to address this subject. The Postpartum Programme was selected for study because pills were introduced into this programme earlier than into the national family planning programme; it, therefore, has the longest continuous experience with oral contraception in Bangladesh.

II. POSTPARTUM PROGRAMME

The basic objective of the Postpartum Programme is to increase the amount of effective contraception among women of reproductive age by providing family planning along with obstetrical services in established hospitals. The concept behind the postpartum approach is simple. Adding family planning services to established obstetrical units capitalizes on existing facilities, equipment, and trained personnel. Moreover, women who enter a hospital for delivery or abortion represent the target population. They are of proven fecundity and are approached to accept contraception at a time when motivation is believed to be high.

Following the international collaborative demonstration of the postpartum concept organized by the Population Council in 1966 [11], there was active initiative to begin such a programme in Bangladesh. By October 1971, postpartum family planning services were offered at three Dacca hospitals: Dacca Medical College, Sir Salimullah Medical College (Mitford Hospital), and Azimpur Maternal-Child Centre. In early 1972 clinics were established in two additional Dacca hospitals: Holy Family and Sher-e-Bangla.

Services are provided to two groups of patients. First are obstetrical inpatients who are hospitalized for either delivery or abortion. These women represent the primary target group of the programme. Essentially all inpatient clients are classified as "direct acceptors" which is defined as acceptance within three months of pregnancy termination. The second group consists of outpatients; these women either visit and are contacted through other clinics of the hospital (gynecological, pediatric, and medical) or come to the postpartum clinic directly for contraceptive services. Most outpatients are "indirect" acceptors (acceptance after three months of delivery), although about 20 per cent are "direct" acceptors. Inpatient postpartum services are provided in four of the five postpartum hospitals. Sher-e-Bangla hospital has no obstetrical patients.

A clinic staff consists of one lady physician, one lady family planning worker and one or more lady health workers. The staffing strength of most clinics however has generally been below par ; some clinics have operated, for example, with only periodic supervision of a physician ; some workers have been borrowed on a temporary basis ; and turnover of staff is rapid. The staff attempts to contact and motivate every inpatient during her postpartum convalescence period. Those who have two or more children are urged to accept sterilization. The remainder are encouraged to accept a choice of methods : oral pills, IUDs, or conventionals. Because of inadequate facilities and trained manpower, very few of those requesting sterilization have been accommodated in the past. Those requesting IUDs are given appointments to return for an insertion 40 days after delivery. Oral contraceptive acceptors are instructed to begin their first cycle on the 27th day after delivery. Abortion cases are directed to take first pill the day after pregnancy termination.

Clinics charge a standard rate of Taka 0.25 per cycle of oral pills. This charge is waived for indigent patients. No monetary incentives are offered to either client or staff. Since the Programme's inception, two brands of pills have been offered : Ovral 28 and Combination 5. Both of these brands are low dose estrogen-progesterone combinations, containing 50 mg. of ethynil estradiol and 0.5 mg. of norgestrel. Patients are given an average of two cycles at the initial visit and an appointment for medical followup and resupply is made before discharge. Followup services are provided only within the clinic ; the programme suffers from the lack of sufficient staff for home followups.

Since inception the Postpartum Programme has maintained clinic records of all clients. Acceptor visits, either new or followup, are recorded first into register books. These data are then transferred to clinic registration forms. These records contain information on personal characteristics, socioeconomic status, some attitudinal variables, and medical, pregnancy, and previous contraceptive histories. A sample form is shown in Appendix I.

Good and uniform record keeping has not been strictly maintained. Incomplete records are common and in some clinics followup visits were recorded only in the registration books and not transferred completely to individual clinic records. An examination of the January 1974 registration books at Mitford Hospital showed that over one-third of followup data were not transferred to client clinic records. In some cases clients lost their registration cards, making it impossible to record followup information.

Methods and Procedure

Over a 27 month period (October 1971 to December 1973) there were 15,843 clients in the five Dacca hospitals who selected oral contraceptives as their first methods. This represented 73 per cent of all postpartum programme acceptors. Of the pill clients, 5,622 or 35 per cent inpatients and the remaining 10,221 or 65 per cent were outpatients. Approximately half of all pill clients accepted before January 1973 and the remaining half in the calendar year 1973.

To select a sample of clinic records for analysis, the registration forms were stratified according to the following factors: inpatient versus outpatient acceptance, date of first acceptance (before or during 1973), and hospital of acceptance. A sample of 1,180 records was chosen by systematically selecting every 13th record in each stratum. The sample size from each stratum was proportional to the total size of that stratum, thereby providing a self-weighted sample. Of 1,180 records sampled, 400 (34 per cent) were of inpatients and the remaining 780 (66 per cent) were of outpatients. Since there were 15,843 acceptors, a sample size of 1,180 represented a sampling ratio of 1/13.

The information on the sampled records then were coded for punchcard counter-sorting. Standard definitions were employed. The number of oral cycles completed by each client was assumed to be equal to those that she received from the clinic. For dropout cases, however, it was assumed that the number of cycles actually completed included only half of those supplied at the last clinic visit.

Only first method, first segment continuation rates were computed [4]. This study consists therefore of only women who accepted oral pills during their first clinic visit. Those who switched to oral contraceptives after using another method were excluded. Only the first segment of use was considered. That is, women who started with oral pills and then switched methods were classified as a dropout at the time of the first switch of methods. Continuation rates were computed employing the life table technique of Potter [7]. An illustration of the life table technique is shown in Appendix II, where clinic continuation rates of outpatient pill users are computed.

Finally, although 1,180 records were sampled, only 1,164 cards were punched for analysis. Due to an unexplained reason, information on 16 women was lost during the data transfer process. These 16 women were inpatients who accepted in late 1971. From the analysis that follows, it appears that the omission of these women probably did not significantly alter the findings.

III. RESULTS

Postpartum Statistics

The number of new acceptors and followup visits by method and by the category of acceptance in the Postpartum Programme for 1972 and 1973 is shown in Table I. Over a two year period, there were 19,600 new acceptors and of these clients, 73 per cent selected pills as the first method. About 22 per cent chose conventional methods (condoms or foam) and very few had either IUD insertion or sterilization. With the exception of sterilization, there were consistently more new acceptors among indirect as compared with direct acceptors. The total number of followup visits only modestly exceeded the total number of new acceptors. The ratio of return visits to new acceptors is highest for IUDs and lowest for conventionals, with pills in between. There were no followup visits recorded for sterilized patients.

TABLE I

**NUMBER OF NEW ACCEPTORS AND FOLLOWUP VISITS BY
METHOD AND BY CATEGORY OF ACCEPTORS IN THE
BANGLADESH POSTPARTUM PROGRAMME
(JANUARY 1972—DECEMBER 1973)***

Method	No. of New Acceptors			No. of Followup Visits		
	Direct	Indirect	Total	Direct	Indirect	Total
Oral Pill	6,515	7,792	14,307	5,063	14,578	19,661
Conventional	1,745	2,542	4,287	905	2,692	3,597
IUD	19	192	211	33	595	628
Ligation	794	1	795	0	0	0
Total	9,073	10,527	19,600	6,021	17,865	23,886

* These data include a small number of clients from clinics outside of Dacca.

In Table II is presented the number of obstetrical cases according to type of pregnancy termination, the number of new acceptors according to category of acceptance, and the computed total acceptance ratios and direct acceptance rates of the Postpartum Programme in 1972 and 1973. Over the two year period, 18,165 obstetrical cases were hospitalized in postpartum hospitals. Approximately 12 per cent of these obstetrical cases were due to complications associated with abortion; the remaining were for deliveries. During this same period, there were 19,600 new postpartum acceptors. Approximately 46 per cent of all new acceptors were direct; that is, acceptance within three months of pregnancy termination.

TABLE II

**OBSTETRICAL CASE LOAD, NUMBER OF NEW ACCEPTORS,
AND ACCEPTANCE RATIOS OF THE BANGLADESH
POSTPARTUM PROGRAMME (1972 AND 1973)***

Recruitment Performance	1972	1973	Total
Deliveries	7,637	8,309	15,946
Abortions	1,147	1,072	2,219
Total Obstetrical Case Load	8,784	9,381	18,165
Direct Acceptors	3,849	5,224	9,073
Indirect Acceptors	4,800	5,727	10,527
Total New Acceptors	8,649	10,951	19,600
Total Acceptance Ratio	0.98	1.17	1.08
Direct Acceptance Rate	0.44	0.56	0.50

* These data include a small number of clients from clinics outside of Dacca.

Postpartum recruitment performance can be measured by two ratios. The first is the "total acceptance ratio" which is defined as the number of new acceptors divided by the number of obstetrical cases. This is only a crude measure of recruitment since part of the numerator comes from non-hospitalized clients and acceptance among this group may be prompted by factors other than the in-hospital motivational effort of the programme. The second index is the "direct acceptance rate" which relates the number of direct acceptors to the obstetrical case load during the same period of time. This rate is more reflective of performance since nearly all of the numerator comes from the population of the denominator.

The data in Table II show that the total acceptance ratios for 1972 and 1973 were 0.98 and 1.17 respectively. The two year ratio was 1.08. These ratios may be somewhat misleading since one of the five post-partum hospitals had no obstetrical cases at all. Acceptors from this

clinic would inflate the numerator without a corresponding alteration of the denominator. A more accurate index is direct acceptance rates, which were 0.44 and 0.56 for 1972 and 1973 respectively. The average rate for the two years was 0.50 implying that about half of all obstetrical cases were accepting contraception.

The number of new acceptors appeared to be increasing with time. Table III shows the trend of annual increases of new pill clients in the sample population by clinic since the inception of the programme. About 65 per cent of all clients were recruited from Dacca and Mitford hospitals. From 1972 to 1973 a 20 per cent increase in new acceptance was observed.

TABLE III
NUMBER OF NEW ORAL PILL ACCEPTORS BY CLINIC
AND YEAR OF ACCEPTANCE (IN SAMPLE)

Hospital	Number			Total Pill Acceptors
	1971*	1972	1973	
Dacca Medical College	24	160	200	384
Mitford	39	187	201	427
Holy Family	18	72	90	180
Azimpur	10	12	50	72
Sher-e-Bangla	10	40	49	99
Total	101	471	590	1162

* Postpartum services were offered for only part of the 1971 calendar year.

Characteristics of Acceptors

In Table IV is shown the age pattern of postpartum oral contraceptive acceptors according to client status. To examine the selectivity of these patients with respect to the total eligible population, the age

distribution of currently married women reported for Dacca City in the 1961 census is also shown [6]. The data in Table IV suggest that inpatients were on the average younger than outpatients and both groups were younger than the currently married Dacca population in general. The mean ages of in- and outpatients were 25.0 and 26.5 years respectively; in contrast, the mean age of married women in Dacca was 27.6 years. Husbands, on the average, were 10 years older than wives. Of inpatients, 82.8 per cent were under 30 years, while the corresponding percentage of outpatients was 75.9 and of married women was 65.1.

TABLE IV
NUMBER AND PER CENT DISTRIBUTION OF INPATIENTS,
OUTPATIENTS AND MARRIED WOMEN OF DACCA CITY
IN 1961 ACCORDING TO AGE

Age of Women	Inpatient		Outpatient		Currently Married Women Dacca City, 1961	
	Number	Per cent	Number	Per cent	Number	Per cent
15—19	74	19.3	73	9.4	13,267	17.2
20—24	134	34.9	262	33.6	19,244	24.9
25—29	110	28.6	257	32.9	17,741	23.0
30—34	47	12.2	136	17.4	12,516	16.2
35—39	18	4.7	41	5.3	8,384	10.9
40—44	1	0.3	11	1.4	6,027	7.8
All Ages	384	100.0	780	100.0	77,179	100.0
Mean	25.0		26.5		27.6	

That postpartum inpatient acceptors were younger than the married Dacca population is not surprising, since women hospitalized for pregnancy termination tend to be younger than the married population in general. Similarly, outpatient acceptors may also be younger because many are recruited from the pediatric clinic: women attending these clinics usually have young children.

Table V presents the distribution of inpatients and outpatients according to the number of years of completed schooling. While about half of all clients in both categories had not attended formal schools, the general level of education was higher than the national average. Among acceptors, over 30 per cent completed primary school and about 15 per cent completed matriculation. This contrasts with a national literacy rate of 15 per cent for 15 year olds and over as reported in the 1961 census.

TABLE V
NUMBER AND PER CENT DISTRIBUTION OF INPATIENTS
AND OUTPATIENTS TO NUMBER OF YEARS OF
COMPLETED SCHOOLING

No. of Years of Completed Schooling	Inpatient		Outpatient	
	No.	Per cent	No.	Per cent
0	199	51.8	376	49.2
1—4	21	5.5	46	5.9
5—9	84	21.9	162	20.8
10 or More	55	14.3	98	12.6
No Response	25	6.5	98	12.6
All	384	100.0	780	100.1

Although the level of educational attainment of postpartum acceptors was slightly higher than the national average, their socioeconomic status could be classified as primarily urban poor or lower middle class. Husband incomes averaged about Taka 300 per month. Virtually none of the female clients were employed in occupations outside of the home.

The education variable showed considerable differential by clinic. Table VI presents the distribution of years of completed schooling of clients by clinic. The lowest average level was Mitford Hospital with clients averaging less than 2 completed years of schooling. Mitford clients contrasted sharply with those attending Holy Family where the level of education averaged 6.6 years.

TABLE VI
PER CENT DISTRIBUTION OF CLIENTS ACCORDING TO
THE NUMBER OF YEARS OF COMPLETED SCHOOLING
AND BY CLINIC

No. of Years of Completed Schooling	Hospital				
	Dacca Medical	Mitford	Holy Family	Azimpur	Sher-e- Bangla
0	39.5	73.8	15.6	54.2	40.4
1—4	5.5	4.4	(5.6)	(16.7)	(5.1)
5—9	19.3	13.3	42.8	(15.3)	27.3
10 or More	12.2	5.9	31.7	(12.5)	(15.2)
No Response	23.7	(2.6)*	(4.4)	(1.4)	(12.1)
All	100.0	100.0	100.1	100.1	100.1
Mean	3.5	1.7	6.6	2.2	4.0

* Parenthesis indicates per cent based on less than 20 clients.

The number of living children of postpartum acceptors is shown in Table VII. The mean numbers of living children were 3.1 and 3.7 for in-and outpatients, respectively. Only a very small percentage of clients reported no living children. Nearly half of all acceptors had two to four living children and less than 10 per cent had seven or more.

TABLE VII
NUMBER AND PER CENT DISTRIBUTION OF INPATIENTS
AND OUTPATIENTS ACCORDING TO NUMBER OF
LIVING CHILDREN

Number of Living Children	Inpatient		Outpatient	
	No.	Per cent	No.	Per cent
0	12	3.1	13	1.7
1	106	27.6	79	10.1
2	64	16.7	148	19.0
3	60	15.6	144	18.5
4	50	13.0	137	17.6
5	38	9.9	95	12.2
6	20	5.2	81	10.4
7	18	4.7	38	4.9
8 or More	13	3.4	29	3.7
No Response	3	0.8	16	2.1
All	384	100.0	780	100.2
Mean		3.0		3.7

Acceptors reported a mean age of marriage of 15 years, with first pregnancy at 16 years. The average client reported 4.6 prior pregnancies with 10.1 per cent ending in fetal wastage. Sixteen per cent of the live births had died prior to the time of acceptance.

In Table VIII the reproductive or biological status of clients at the time of acceptance is presented. Nearly 90 per cent of inpatient acceptors were in the state of postpartum amenorrhea; 6 per cent offered no response. Although 5 per cent of inpatients claimed that they were in the menstruating state (either menstruating or between successive menses), it is likely that these responses were incorrect since it is virtually impossible for a postpartum women to experience no amenorrhea at all. It is possible that responses were given by abortion patients who had very brief periods of gestation and who could anticipate an early return of postpartum menses. Two thirds of outpatient clients reported that they were in the menstruating (ovulatory) state. Only a small proportion (11.3 per cent) claimed to be in postpartum amenorrhea. No response was obtained from 21.8 per cent.

TABLE VIII

**NUMBER AND PER CENT DISTRIBUTION OF INPATIENTS AND
OUTPATIENTS ACCORDING TO REPORTED REPRODUCTIVE
STATUS: POSTPARTUM AMENORRHEA, MENSTRUATING,
OR PREGNANT**

Reproductive Status	Inpatient		Outpatient	
	No.	Per cent	No.	Per cent
Postpartum Amenorrhea	340	88.5	88	11.3
Menstruating	21	5.5	522	66.9
Pregnant	0	0	0	0
No Response	23	6.0	170	21.8
All	384	100.0	780	100.0

Most acceptors stated that they did not want more children (Table IX). About a third stated spacing as the reason for acceptance.

TABLE IX

**NUMBER AND PER CENT DISTRIBUTION OF INPATIENTS AND
OUTPATIENTS ACCORDING TO DESIRE FOR MORE
CHILDREN OR SPACING**

Desire for More Children or Spacing	Inpatient		Outpatient	
	No.	Per cent	No.	Per cent
No	210	54.7	515	66.0
Spacing	159	41.4	235	30.2
No Response	15	3.9	30	3.8
All	384	100.0	780	100.0

In summary, the average postpartum acceptor can be characterized as a relatively young mother, usually, in her twenties, with more than average educational attainment. Her socioeconomic status is either urban poor or lower middle class. The client has two to four living children and desires contraceptions for the purposes of terminating childbearing. At the time of acceptance an inpatient acceptor was experiencing postpartum amenorrhea while an outpatient client was either menstruating or in between successive menses.

Clinic Continuation Rates

Table X shows the proportion of acceptors according to the number of followup clinic visits. These rates are computed according to the life table technique shown in Appendix II. Of inpatients, 16 per cent returned for one followup clinic visit and only about 5 per cent returned for three visits. The corresponding rates for outpatients were better, but not markedly so. Nearly half returned for one followup visit ; one quarter for two visits ; and 16 per cent for three visits.

TABLE X

**PROPORTION OF INPATIENTS, OUTPATIENTS, AND ALL PATIENTS
RETURNING FOR FOLLOWUP VISITS ACCORDING TO THE
NUMBER OF FOLLOWUP VISITS**

No. of Followup Clinic Visits	Inpatient (384)	Outpatient (780)	All Patients (1162)
0	1.00	1.00	1.00
1	.16	.46	.36
2	.09	.31	.24
3	(.05)*	.21	.16
4		.13	.10
5		.06	.07
6		.07	.05

* Parenthesis indicates rate based upon less than 20 observations.

This pattern of followup visits is reflected by the clinic continuation rates shown in Table XI. In interpreting this table it is important to recognize that dropout cases were credited with completing half of the oral cycles dispensed at the last visit. For inpatients, slightly over half completed one cycle but only 15 per cent were continuing users. Outpatients fared slightly better. Three quarters completed one cycle; nearly half completed three cycles; and about one-third finished six cycles. At 12 cycles about 16 per cent were continuing users.

TABLE XI

**PROPORTION OF INPATIENTS, OUTPATIENTS, AND ALL PATIENTS
COMPLETING A CERTAIN NUMBER OF ORAL CONTRACEPTIVE
CYCLES**

No. of Cycles	Inpatient (384)	Outpatients (780)	All Patients (1162)
0	1.00	1.00	1.00
1	.60	.75	.70
3	.15	.42	.33
6	.10	.31	.24
9	(.06)*	.23	.17
12		.16	.12

* Parenthesis indicates rate based upon less than 20 observations.

In an effort to identify some factors that may be associated with longer continuation, the rates on Table XII were computed. In this table, outpatients were separated into two groups according to differential characteristics. The first comparison contracts continuation rates for those who returned for one or more followup visits with those who never returned. As the data show, those who returned had markedly higher continuation rates. About half were continuing users at nine cycles and about a third at twelve cycles.

TABLE XII

PROPORTION OF OUTPATIENTS ACCORDING TO NUMBER OF FOLLOWUP VISITS, AGE, EDUCATION, AND NUMBER OF LIVING CHILDREN COMPLETING A CERTAIN NUMBER OF ORAL CONTRACEPTIVE CYCLES

No. of Cycles	All Out-patients	Return Visit		Age		Living Children		Education	
		One or More	None	30 or Over	Under 30	5 or More	Less than 5 or No Response	5 or More	Less than 5 or No Response
(N)	(784)	(480)	(422)	(185)	(594)	(241)	(537)	(250)	(570)
0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
1	.75	.98	.56	.78	.74	.80	.73	.84	.70
3	.42	.86	(1.30)*	.48	.40	.50	.38	.48	.39
6	.31	.66		.37	.30	.41	.27	.33	.30
9	.23	.48		.26	.21	.28	.20	.21	.23
12	.16	.35		.22	.15	.22	.14	.15	.17

* Parenthesis indicates rate based upon less than 20 observations.

Older acceptors (women over 30 years) also tended to have longer continuation rates than young acceptors. This might be due in part to motivational differentials, since older women were likely to be nearer their desired family size. This was suggested by the higher continuation rates for women with five or more living children as compared to those with four or less. Finally, better educated women had slightly better continuation rates. The difference was not marked, however, and by the ninth cycle, the differential had essentially disappeared.

Further data analysis not presented here showed that other characteristics such as age at marriage and income of husbands failed to correlate with the probability of followup visits. The only other differential characteristic which showed some correlation with the likelihood of followup visits was previous ever-use of family planning methods. Of all cases that returned for followup visits, 31.6 per cent reported previous contraceptive use, while the corresponding rate among those failing to return was 19.3 per cent.

Additional but limited information on pill continuation was obtained during a small September 1974 survey of 38 purposively selected pill acceptors of January 1974. Of the 38 January clients, only 27 could be traced in September and only 10 could be interviewed in depth. The remaining had either incomplete addresses or had shifted residence. Of the 10 investigated cases, 6 clients had switched methods, mostly to condoms. Two had discontinued contraception completely and the remaining 2 were continuing pill users but were being supplied by other sources. Seven complained of minor side-effects; scanty menstrual flow was the commonest. Other complaints included obesity (2), weakness (2), abdominal pain (1) and irregular cycles (1). One woman was pregnant at the time of interview.

IV. DISCUSSION

It is important to recognize that the rates reported in this paper are first method, first segment clinic continuation rates. Clinic continuation data are limited by a number of uncontrolled factors. First, resupply of oral pills from sources other than from the clinic of first acceptance, such as commercial outlets or even another postpartum clinic, is not recorded. A client who began oral contraception at a clinic but was resupplied from another source would be credited with a briefer than actual period of use. Secondly, the record keeping system might have abbreviated the real length of continuation. Followup visits were recorded in a registration book and later transcribed into individual clinic records. Incomplete transfer of data would artificially

shorten continuation. Also, lost or misplaced records might result in filling out of a new form, thereby bifurcating one segment into two. Thirdly, without followup information, one must make assumptions on how many cycles, particularly those supplied in the last visit, were actually taken. In the case of this study, we assumed half of the cycle in the last supply was completed. This assumption is unsubstantiated. The September 1974 survey showed that these limitations were of major importance. Thus, the continuation data presented here should be viewed with caution.

The biases associated with these significant constraints certainly limit the preciseness of data on continuation rates. Overall, these reported rates are probably briefer than actual rates, but the magnitude is uncertain. Regardless of these methodological shortcomings it is unlikely that the true rate would alter the basic conclusions and recommendations offered in this report.

Sivin in his international study of postpartum acceptors reported an average one year (12 cycle) rate of 55 per cent, with national levels ranging from 33 (Turkey) to 72 (Thailand) per cent [8 ; 9]. In neighbouring India, higher rates have been reported also. Majumder *et. al.* reported a six month continuation rates of 42 and 70 per cent for urban women in West Bengal [5]. At 12 months, 31 to 61 per cent of these women were continuing users.

Given the Bangladesh continuation rates, the net demographic impact of the postpartum programme is probably modest. Inpatient acceptors were all in postpartum amenorrhea, a temporary period of sterility. Contraception during this periods yields very little, since women are already protected against conception. Most outpatients were in the menstruating (ovulatory) state. This is the period when a woman is at risk of conception and contraception prolongs this state. This prolongation, in the absence of other factors, increases the interval between successive live births and thus reduces fertility. This fact coupled with the slightly better continuation rate of outpatients suggest a greater demographic impact among outpatient compared with inpatients.

The magnitude of this impact can be approximated crudely in the following manner. According to Chen, *et. al.*, the average interval between successive live births in the absence of contraception is about 33 months in rural Bangladesh [1]. While it is hazardous to extend this observation to urban Bangalee women, its use provides an illustration of demographic impact. If this average length were to apply to postpartum clients and each acceptor were to receive an average of three months (cycles) of protection, the birth interval would be lengthened from 33 to 36 months, a net increment of three months. This implies that 11 acceptors would prolong intervals by about 33 months, which is the time required for one live birth. In a crude manner, therefore, 11 outpatient pill acceptors, averaging three months of protection, would result in one averted birth. In the postpartum programme from October 1971 to December 1973, there were 10, 221 outpatient pill acceptors implying about 1,000 averted births.

One major feature of the data presented in this study is the high recruitment performance of the Bangladesh programme in comparison to other national postpartum programmes. Recruitment ratios in Bangladesh were considerably higher while continuation rates were lower than other national postpartum programmes. The total acceptance ratio of 1.08 is more than twice that reported for the international postpartum programme. Wright in his assessment of postpartum performance reported average international ratios varying from 0.28 to 0.42 from 1966 to 1972 [10]. Similarly, Bangladesh's direct acceptance rate of 0.50 is over twice that of the international average, which ranges from 0.15 to 0.24.

These are extremely favourable indices. They however may be counter-balanced by the Bangladesh contraceptive mix and brief continuation rates. About 73 per cent of Bangalee postpartum acceptors were selecting pills; very few accepted IUDs or sterilization. Sivin has shown from the Postpartum Programme's Worldwide Followup Survey that continuation rates for pill and "other" method acceptors were far less than for IUD acceptors even after control for age, number of living children, and stated desire for more children [8; 9].

Future programme efforts, therefore, need to be directed at achieving a more effective contraceptive mix among acceptors. Rather than pills, clients should be encouraged to accept sterilization or IUD. The latter two methods offer longer protection and possess the potential of generating far greater demographic impact. This realignment of priority of methods ought to be pursued even if recruitment ratios were to decline, since the fall in recruitment would probably be more than compensated by more effective contraception.

This study also indicates the need for a postacceptance prospective followup survey of postpartum pill clients. In particular, it would be useful to determine use-effectiveness, reported side-effects, and causes of dropout. This research seems particularly appropriate in light of the known side-effect of pills on lactation. While no information in this regard is available on urban postpartum acceptors, breastfeeding is universal and prolonged in rural Bangladesh [1]. Possible deleterious effects of pills in interfering with or terminating lactation need to be identified. Only through such research would it be possible to make the necessary adjustments to improve programme performance. Furthermore, studies of this nature should be extended to rural Bangalee women, who constitute 95 per cent of the target population.

V. SUMMARY

This report presents the results of an analysis of 1,164 sample clinic registration forms of oral contraceptive acceptors in the Bangladesh National Postpartum Programme from October 1971 to December 1973. National postpartum statistics are tabulated; characteristics of acceptors are analyzed; and clinic continuation rates are computed.

From January 1972 to December 1973, there were 19,600 new acceptors and 23,886 followup visits in the Bangladesh Postpartum Programme. Seventy three per cent of all acceptors selected the oral pill and 22 per cent accepted conventional methods. Of pill clients, 35 per cent were inpatients and about 48 per cent were direct acceptors.

By international standards, the recruitment performance of the programme was very high. Fifty per cent of hospitalized obstetrical patients accepted the motivational efforts of the programme staff.

The mean age of postpartum acceptors was 26 years, younger than the general population of Dacca City. Acceptors on the average were slightly better educated and had two to four living children. Very few worked outside of the home, and the average reported family income was about Taka 300 per month. Nearly all inpatient acceptors were experiencing postpartum amenorrhea, a period of temporary sterility, and most outpatient clients reported that they were either menstruating or in between successive menses at the time of acceptance.

Sixteen per cent of inpatient acceptors returned for one or more followup visits as compared to 46 per cent among outpatient clients. The median continuation rates for in- and outpatients were one and three oral cycles, respectively. Older clients and those with five or more living children and with previous ever-use of family planning tended to have longer continuation rates; the level of educational attainment appeared to exert only a modest influence on continuation.

These continuation rates are believed to be biased toward brevity, because only clinic forms were used in this analysis. Patient data were first recorded in registration books and there is evidence that data transfer from the register to clinic forms was incomplete. Regardless of these limitation, the analysis suggests that the net demographic impact of oral pill use among inpatient acceptors was small since nearly all of these clients were experiencing postpartum sterility. A modest impact was computed for outpatients who had slightly longer continuation rates. Most of these women were at risk to conception at the time of acceptance.

Much future effort needs to be directed at achieving a more effective contraceptive mix among postpartum acceptors. Rather than oral pills, clients should be encouraged to accept sterilization or IUD, since the pill has low continuation rates while the latter two methods offer longer protection. Additional research is needed also to identify use-effectiveness, side effects and causes of dropout. Studies of this nature should be extended also to rural women, who constitute 95 per cent of the target population in Bangladesh.

Appendix I**CLINIC REGISTRATION FORM**

Name of the clinic _____ Indoor/Outdoor _____
 Interviewed by _____ Date _____
 Registration No. _____ Date _____
 Client's name _____ Age _____
 Education _____ Occupation _____ Income _____
 Husband's name _____ Age _____
 Education _____ Occupation _____ Income _____
 Husband's pet name _____
 Father-in-law's name _____
 Address _____
 Age at marriage _____ Age at first pregnancy _____
 No. of living children _____ Living son _____ Living daughter _____
 Dead _____ Still born _____
 No. of abortion _____ Last abortion ended _____ Months/Years _____
 Termination of last pregnancy _____ Live birth _____
 Wasted _____
 Age of last living child _____
 Menstrual status : L.M.P. _____ Lactation amenorrhea _____
 Pregnancy _____ Puerparium _____
 Wants any more children _____ Used any F.P.method: Condom _____ Month/Year _____
 Emko _____
 Pill _____
 Coil _____
 Rythm _____
 Method chosen _____ Method supplied _____ Amount supplied _____
 Client category : Direct acceptor _____ Indirect acceptor _____
 Advance only _____ Appoint only _____
 Others _____
 General examination : B.P. _____ mm. Hq. Weight _____ lbs.
 Breast _____
 Urine examination : Done _____ Not done _____
 Sugar _____ Albumin _____
 Pelvic examination : Done _____ Not done _____
 Ut : _____ Cx : _____ Fornix : _____
 Date of revisit _____
 Brief case history : _____

Followup Revisit

Date	Comment	Amount supplied	Date of revisit
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Appendix II

LIFE TABLE OF OUTPATIENT CLINIC CONTINUATION RATES

No. of cycles	No. of women discontinuing during month x	No. of women continuing during month x at study cut off	No. of women at risk of discontinuing at month x	Adjusted No. of women at risk of discontinuing during month x	Probability of discontinuing during month x	Probability of continuing during month x	Probability (cumulative) of continuing to month x
X	T	W	N	N*	Q _x	P _x	Cum P _x
0	194	0	780	780.0	.2487	.7513	1.0000
1	127	1	586	585.5	.2169	.7831	.7513
2	129	11	458	452.5	.2851	.7149	.5883
3	32	7	318	314.5	.1017	.8983	.4206
4	32	7	279	275.5	.1162	.8838	.3778
5	15	1	240	239.5	.0626	.9374	.3339
6	25	11	224	218.5	.1144	.8856	.3130
7	13	5	188	185.5	.0701	.9299	.2772
8	20	0	170	165.5	.1208	.8792	.2578
9	17	4	141	139.0	.1223	.8777	.2266
10	12	3	120	118.5	.1013	.8987	.1989
11	7	7	105	101.5	.0690	.9310	.1788
12	11	7	91	87.5	.1257	.8743	.1664
13 or more	32	41	73	52.5	.6095	.3905	.1455

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Pricing Policy for State Enterprises in Bangladesh

by

W. B. REDDAWAY*

I. INTRODUCTION

There is a substantial literature about the price policy which should be followed by nationalised enterprises. This usually centres around three objectives :

- (a) Their selling prices should be fixed in such a way that they will need to be run efficiently if they are to make a target rate of profit.
- (b) There should be a "test rate of discount" which new schemes should earn (or be expected to earn) before being undertaken.
- (c) The enterprises should earn profits as a contribution to the finance of investment (not necessarily their own investment).

The third of these objectives is usually regarded as particularly important in developing countries. The First Five Year Plan for example, looked to the gross profits of the nationalised sector for a significant proportion of the funds for development outlay, rising to 144 crores in 1977/78 (measured at 1972/73 prices).

II. DIFFICULTIES OF PRICE FIXING

The first of the above three objectives is usually conceived primarily as a means of devolving power and responsibility on the managers of the enterprises. It assumed that if proper prices are fixed, usually by some outside authority (or at least with the approval of an outside authority), then the managers can be left to get on with the job of running

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the enterprise, and their efficiency can be judged by the profits produced. An important by-product is that they will be "automatically" restrained from paying excessive wage-rates by the need to make profits, and also from over-manning.

The literature is, however, apt to pass very lightly indeed over the problem of how the supervisory authority can acquire the necessary data for fixing appropriate prices.¹ There may well be no practicable source of information except the enterprises themselves: quite apart from the difficulty of getting data about the costs per unit of output actually incurred, this leaves quite untackled the problem whether the current level of efficiency is acceptable or not (and if not, how much should be deducted to arrive at what costs ought to be). The managers of the enterprises want to have a comfortably high price fixed, and have a natural incentive both to exaggerate the actual level of costs and to claim that efficiency is already as good as can be expected. The problems are made much more difficult in the very common case where the enterprise produces a large number of different products.

One feature of outside price-fixing as a means of trying to enforce efficiency has become more important in recent years. The whole business of applying to an outside authority for permission to raise prices is likely to involve a substantial amount of time: the data have to be prepared and scrutinised by the supervisory authority, the latter is apt to have a queue of applicants, Consumers Councils and the like (not to mention Ministries) often have to be given a chance to make representations, and so on. It is quite impracticable to go through all this more frequently than once a quarter: indeed, that would involve a tremendous usage of skilled manpower in all the bodies concerned. Moreover it is usually too difficult to keep "up-dating" the figures which were originally submitted in the light of what happens during the course of the enquiry, since these amendments would also have to be scrutinised. So the normal upshot is that the prices which are finally approved are based on information which is already out of date at the time of the announcement, and that nevertheless they will have to prevail for a substantial period without amendment.

The factor which has made these inevitable delays so serious in recent years is, quite simply, inflation. If the enterprise's costs rise after the award for reasons quite outside its control, prices fixed in the above way

¹ By way of contrast it often deals at great length with the principles which are involved, and may discuss many subtleties (e. g., shadow pricing, or the allowance for future improvements in productivity).

will quite inevitably lead to its making large losses, unless either the supervisory authority allows the inclusion in the price-fixing formula of an allowance for future inflation or the costs submitted by the enterprise were exaggerated and this was not detected.²

In theory, a supervisory authority might try to make an allowance for the effect of inflation on costs, but this is seldom attempted: it would indeed be embarrassing to the government for anything precise to be publicly stated. The result is that nationalised enterprises the world over are now typically reporting losses (even on the basis of historical costs), if prior approval of their prices is required.

One further problem for the price-fixing authority is also important for a country like Bangladesh. For many nationalised enterprises the outcome of the year's operations is likely to be much affected by many factors besides the price which is fixed and the efficiency of the management. What is the authority to assume, for example, about the supply of imported materials and spares, transport delays, power failures and the level of demand? And if its assumptions are wrong (as some are bound to be) what is the value of the so-called "automatic check" through the profit and loss account?

III. SUGGESTED POLICY FOR BANGLADESH

In view of all this, it seems to me necessary first to recognise that attempts to secure an "automatic" enforcement of efficiency by using a supervisory authority to fix (or approve) prices are futile. Managers would be continually having to divert their attention from running the business to trying to persuade the price-fixing authority to allow them a price increase and the bank manager to allow them a higher overdraft to cover their losses. An enterprise which is pushed by a price control system which does not allow for inflation into making losses is "automatically" forced into many things which are undesirable, e.g., postponing repairs, running down stocks. Moreover, the macro-economic objective of financing a good part of the development outlay from profits of nationalised enterprises would almost certainly be hopelessly prejudiced.

To my mind it is best to adopt a much less ambitious objective, and to concentrate first on this macro-economic objective. Enterprises should

² Conceivably, of course, some factor may lead to a big fall in costs, e.g., an increase in the foreign exchange allocation for imported materials or a better supply of sugarcane. But the extraneous factor may quite well work in the opposite direction.

be told that their primary objective must be to end up each year with a realised profit, and each enterprise would be given a target figure at which to aim.³ There should be other *ex-post* checks on their performances (discussed below), but the managers should know that if they end up with a loss or with a profit far below the target, they will be considered *prima-facie* guilty of inefficiency. There would be no *ex-ante* investigation of their prices.

It is worth while emphasizing that an instruction of this kind puts on the manager the onus of reacting sufficiently rapidly and effectively to everything which may affect the business. It is not just a matter of making efficient arrangements for the "normal" running of their business: transport difficulties, material shortages, increases in costs caused by inflation, floods and many other contingencies may threaten to involve the enterprise in losses, but the manager must react to all of them—whether by price-increases, efficiency improvements, use of substitutes or what not. "The manager's job is to manage", and this includes dealing with awkward contingencies: the tradition fairy-tale ending "so they lived happily ever after" does not apply in real life.

Inevitably, some enterprises will nevertheless make losses or fall far below the profit target. The managers would then have to produce a report explaining their failure, and it would be wise to have a supervisory body which would consider these explanations, and have the power to call for further information and cross-question the managers. The supervisory body might consider the explanation satisfactory, e.g., if supply of an indispensable material were cut off completely during the fourth quarter of the financial year: alternatively it might consider that action should have been taken to avoid losses, and censure the managers or even call for some of them to be dismissed. It is not, however, any use to dismiss a manager because of a loss unless somebody better is available.

It is of course possible that an inefficient manager will achieve the profit target by charging too high prices and raising prices too rapidly.

³ I do not wish to discuss here the principles by which these targets are to be fixed. Broadly speaking the ones set out in the Annual Plan for 1974/75 (P. 111) provide a good starting point, so long as they are interpreted as applying to *ex-post* results, rather than to *ex-ante* price-fixing (for which the data would not be available). In the case of semi-luxury items which are sold to distributors whose selling prices cannot effectively be controlled (e.g., motor cycles) the best way of ensuring that the benefit of the high final prices accrues to the government rather than the distributor is to charge an excise.

Moreover if nobody considers the prices at all critically, the enterprise may also pay unduly high wages and take "soft" decisions in manning and other matters, relying on high prices to cover the cost. What safeguards can one add to the simple rule of making a profit?

Even on an *ex-post* basis, there can be no completely reliable way of detecting "excessive" prices of this kind, and certainly no automatic way: this would require a reliable means of establishing not only what costs were, but what they should have been, with efficient and tough managers. Nevertheless the rules set out in the following paragraphs would be helpful.

Efficiency Audit. The supervisory body should have the right to impose an efficiency audit on any enterprise, whether profitable or not. This might consist simply in establishing whatever criteria of performance seemed possible in a particular case, and calling on the managers to explain in writing why (for example) their output per loom or per man-hour was so much lower than in an earlier period (or than it is in India), or why their selling price is so high by international standards: the managers could be cross-examined and their answers published. In more serious cases it might seem appropriate for international consultants to be called in (e.g., from India) to make a thorough investigation. Some of these investigations may prove genuinely useful, but in any case soft and inefficient managers will be under an incentive to avoid being made to submit to one.

Price Watching. It would be part of the rules for every nationalised enterprise that it should have a publicly available schedule of its selling-prices; a copy of this would have to be sent to the supervisory body, with a statement of the increase which this schedule represents compared with the last (on the basis of a weighted average).

This information would provide the supervisory body with some guidance as to which enterprises seemed to require an efficiency audit. In any case, managers do not like exposing themselves to criticism by having to announce frequent or large increases in price.

Finally, it may be as well to avoid misunderstanding by saying explicitly that a manager whose enterprise consistently exceeded its profit target by a large amount would not automatically be entitled to high praise: this might, of course, reflect a high and rising level of efficiency, but it might equally reflect overcharging. The objective of my proposed policy is not profit maximisation.

IV. SUPERVISION BY THE BANKS

The above suggestions include provision for some action to be taken by a "Supervisory Body", albeit much less action than would be required by the proposals included in the 1974 '75 Annual Plan (probably on page 40 and pages 109-112). It may be that even this amount of action would place too much strain on the time of skilled administrators.

If this is the case, it strengthens the argument in favour of making the main directive to nationalised enterprises a simple instruction to make certain profits. It would be made clear that the instruction related to realised profits, and was not an instruction to fix prices at a level which would be profitable if costs did not rise, and then forget about them. It would also be made clear that the managers must react rapidly to "the slings and arrows of outrageous fortune", such as raw material shortages, and not simply rely on saying that it was these which produced the loss which their accounts show.

There is however one outside body with which each enterprise is in close and continuous contact, and that is its bank. A banker cannot be expected to act as an ideal monitor of an enterprise's performance, especially in such matters as not overcharging. But if the finances of the various enterprises were put on a reasonable starting basis (i.e., if they were given an appropriate amount of equity capital and long-term loans by the government), then the banks might apply a useful discipline if they were told to treat their nationalised customers on a "business" basis. This "discipline by the bank" would be particularly appropriate if the customer failed to make proper repayment of his first bank loan, and if his accounts showed a realised loss. By such simple devices as calling for a projection of cash flows the banker might help to enforce proper care about the future.

If this line of approach were adopted it would be important to have a proper relationship laid down between the government, the Bangladesh bank, and the ordinary banks (most of which are nationalised).

V. CONCLUSION

It is obvious that the policy suggested in this paper is one which seeks to achieve limited objectives, but I think that they are all practically possible. More ambitious policies are, in my view, likely to lead to highly undesirable results because they ignore such awkward realities as the absence of data and the inflationary rise in prices and costs.

The fixing of prices by nationalised enterprises is, in brief, an area in which it is vital not to allow the (theoretical) best to be the enemy of the (practicable) good—or even the (practicable) mediocre, if that is all that is administratively feasible.

Education and Land Utilisation in a Developing Region : A Study of Gujarat

by

D. R. VEENA*

I. INTRODUCTION

Since the beginning of economic doctrines, land and labour have been recognised as two crucial factors of economic development [6;7]. Less developed countries are poor because qualitative level of working force [1] and pattern of land utilisation [4] are poor in comparison to developed countries. The optimum land utilisation, at given level of other determinants and environments, depends on the quality of actively engaged working force in various economic activities of an economy at various levels of development [5]. This quality is conditioned by formal and informal types of education. Hence, education is an effective input in economic development [8]. The present study, therefore, attempts to examine the role of relative economic efficiency of education in explaining land utilisation for various economic activities in Gujarat State. We hypothesise that the pattern of education influences, at given level of other determinants and environments, the pattern of land utilisation for various economic activities in the region.

II. MODE OF ANALYSIS

The data on districtwise distribution of working force by economic activities and educational levels and nonworking force in rural and urban

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areas have been obtained from the Census of India, 1961 [2]. The data on districtwise areas of land utilisation for various economic activities have been collected from various sources.¹

For testing the hypothesis, classifications of education by levels² and various economic activities as given in the Census of India, 1961 have been used [3]. The collected data on land utilisation for economic activities have been clustered on the basis of the Census-classification of economic activities [3].

The estimate of land utilisation for each economic activity has been made on the basis of proportion of land utilisation to total land utilisation in the district: (i) for Agricultural and allied activities (L_A^d), data on land utilisation are related to share of cropped area available for agricultural production to total land utilisation in the district; (ii) for Forestry, plantation, fishing, livestock, hunting etc. (L_F^d), data are related to share of land utilisation for these activities to total utilisation in the district; (iii) for Manufacturing activities at large and small scales (L_M^d), data are related to share of land utilisation for industrial estates areas, places etc. available for industrial production to the total land utilisation in the district; (iv) for Construction activities (L_C^d), data are related to share of land mainly available for construction work for various activities in 1961 to the total land utilisation in the district; (v) for Transport, storage, communication, trade and commerce activities (L_T^d), data are related to share of land utilisation for surface and unsurfaced roads, railway lines and public and private places available for commercial purposes to the total land utilisation in the district; and (vi) other Services (L_S^d), data are related to share of land utilisation for public and private offices, sociocultural places, cooperative housing society etc. to the total land utilisation in the district. This is estimated on the basis of total land utilisation minus total land utilisation for

¹ The (i) Bureau of Economics and Statistics, (ii) Directorate of Agriculture, (iii) Public Works Department, (iv) Gujarat Industrial Development Corporation, (v) Gujarat State Financial Corporation, (vi) Gujarat Industrial Investment Corporation, (vii) Gujarat Small Scale Industrial Corporation, (viii) Gujarat State Land Development Corporation, (ix) Census of India, District Directory Part X-C, 1971, (x) Hand Book of Basic Statistics, 1962 and (xi) Approach to Fifth Five Year Plan, 1972.

² In concept of educational level in Gujarat State, (i) Illiteracy where persons are not in a position to read and write, (ii) Literacy where read and write is possible but not having any particular standard of education, (iii) Primary education is related to educational standard up to VIIIth Class and (iv) Higher education is related to high school and above educational standards including technical and non-technical diploma and degree.

above five activities. The similar method has been used for distribution of working force by educational levels and economic activities in the district.

This study is based on the cross section analysis over space in 1961. For analysis of structural features and testing of the hypothesis various statistical techniques have been used.³

III. KEY DETERMINANTS

This study is related to mainly three sets of variables (i) Education ; (ii) Working force ; and (iii) Land utilisation in various economic activities.

(i) Education

1. E_I^d = Illiterate working force in the district.
2. E_L^d = Literate working force in the district.
3. E_P^d = Primary educational level of working force in the district.
4. E_H^d = Higher educational level of working force in the district.

(ii) Working Force

1. W_A^d = Working force in Agricultural and allied activities of the district.
2. W_F^d = Working force in Forestry, plantation, hunting, mining, fishing, livestock etc. activities of the district.
3. W_M^d = Working force in Manufacturing at large and small scale industries of the district.
4. W_C^d = Working force in Construction activities of the district.
5. W_T^d = Working force in Transport, storage, communication, trade and commerce activities of the district.
6. W_S^d = Working force in other Services⁴ of the district.

³ For association between variables simple correlation ; and for functional relationship between variables regression coefficients have been used.

⁴ Here, other Services include, public services, education, research and other scientific services, medical care, health and sanitary services, religious and welfare services, legal services, business, community services, recreation services, personal services etc., for details see [3].

(iii) Land Utilisation

1. L_A^d = Land utilisation for Agricultural and allied activities of the district.
2. L_F^d = Land utilisation for Forestry, plantation, hunting, livestock, mining, fishing etc. activities of the district.
3. L_M^d = Land utilisation for Manufacturing at large and small scale industrial activities of the district.
4. L_C^d = Land utilisation for Construction activities of the district.
5. L_T^d = Land utilisation for Transport, storage, communication, trade and commercial activities of the district.
6. L_S^d = Land utilisation for other Services of the district.

All variables mentioned above are expressed as proportions of their respective totals for the district.

IV. CORRELATION MATRICES

The relationships of the educational levels of working force with the distribution of working force in economic activities explain that higher education is significantly related to working force in the secondary and tertiary activities like manufacturing, construction, transport, storage, communication, trade and commerce and other services. The primary education is significantly related to working force in agriculture, manufacturing, construction and other services. The illiteracy is only significantly related with working force in forestry, plantation, mining and other allied activities (Table I).

TABLE I

CORRELATION MATRIX OF WORKING FORCE BY ECONOMIC ACTIVITIES AND EDUCATIONAL LEVELS

Variables	E_I	E_L^d	E_P^d	E_M^d	Aggregate R^2
W_A^d	0.4432	0.5955**	0.9869*	0.3116	0.8843*
W_F^d	0.8363*	0.5356**	0.3564	0.0093	0.5437**
W_M^d	-0.0149	0.2948	0.5135**	0.9563*	0.8934*
W_C^d	0.1234	0.7284*	0.4969**	0.6690*	0.6428*
W_T^d	0.2380	0.3893	0.4136	0.6234*	0.5345**
W_S^d	-0.1431	0.4931**	0.5163**	0.7243*	0.7388*

* and ** = Significant at 1% and 5% levels, respectively.

The associations of educational levels of working force and land utilisation for various economic activities indicate that higher education is significantly related to land utilisation for manufacturing, construction, transport, storage, communications, trade and commerce and other services. The primary education is significantly associated with land utilisation for agriculture, construction, transport, communication and trade and other services. The literacy is significantly related to land utilisation in agriculture, forestry, construction and other services. The illiteracy is significantly associated with land utilisation for forestry and allied activities (Table II).

TABLE II

CORRELATION MATRIX OF WORKING FORCE'S EDUCATIONAL LEVELS AND LAND UTILISATION FOR ECONOMIC ACTIVITIES

Variables	E_I^d	E_L^d	E_P^d	E_H^d	Aggregate R^2
L_A^d	0.4439	0.5193**	0.7784*	0.3446	0.9364*
L_F^d	0.8036	0.5166**	0.0346	0.0834	0.5746**
L_M^d	-0.0113	0.2464	0.4433	0.8433*	0.8849*
L_C^d	0.3189	0.6899*	0.5199**	0.5664**	0.5936**
L_T^d	0.2146	0.3266	0.4988**	0.4833**	0.6667*
L_S^d	-0.3849	0.4964**	0.5136**	0.5967**	0.5969**

* and ** = Significant at 1% and 5% levels, respectively.

Thus it can be said that increasing levels of education leads to maximum utilisation of land and working force for agricultural and industrial development at given level of their determinants and environments.⁵

V. REGRESSION ANALYSIS

The above relationships have also been analysed on the basis of the correlation analysis. For measuring the extent of educational impact on land utilisation in various economic activities functional relationships between variables are estimated by the least square method :

$$L_j^d = \alpha + \beta_1 E_I^d + \beta_2 E_L^d + \beta_3 E_P^d + \beta_4 E_H^d + u$$

where $j = A, F, M, C, T$ and S .

⁵ For detail associations of educational levels and economic activities of economic development see [8].

In above regressions, we find that illiteracy is significantly related to land utilisation in forestry. The literacy is significantly related to land utilisation in agriculture, forestry and construction activities. The primary educational level of working force is significantly related to land utilisation in agriculture, manufacturing, construction, transport and communication and other services. The higher educational level of working force is significantly related to land utilisation in manufacturing, construction, transport and communication and other services (Table III).

TABLE III
RESULTS OF LEAST SQUARE METHOD

Variables	α	β_1	β_2	β_3	β_4	R^2
L_A^d	6.46332	0.39434 (0.00036)	0.52367** (0.00643)	0.87390* (0.03347)	0.14320 (0.06436)	0.73566
L_F^d	4.69371	0.89311* (0.00036)	0.56934** (0.00643)	0.04133 (0.03347)	0.00064 (0.06436)	0.48531
L_M^d	0.84389	-0.00231 (0.09964)	0.47903 (0.06936)	0.51323** (0.00364)	0.91389* (0.00041)	0.77647
L_C^d	0.49347	0.03349 (0.04326)	0.78987* (0.00060)	0.52830** (0.00646)	0.64683** (0.00188)	0.64430
L_I^d	0.63228	0.04137 (0.06436)	0.04396 (0.01666)	0.55660** (0.00593)	0.68939** (0.00169)	0.59331
L_S^d	0.56437	-0.00493 (0.07531)	0.05543 (0.04327)	0.53491** (0.00433)	0.53491** (0.00164)	0.67930

Figures in parenthesis are the standard errors of estimates.

* and ** = Significant at 1% and 5% level, respectively.

The results of high education with land utilisation in manufacturing and primary education with land utilisation in agricultural activities are significant at one per cent level. It indicates that primary education, at minimum level, is an essential determinant for land utilisation in agricultural and higher education is for land utilisation in industrial development of the State.

It is interesting to know that higher education level is not related to land utilisation for agricultural and allied activities which may be due to very low level of density and size of higher educated working force in these activities. However, this functional relationship indicates that higher educational level of working force in various economic activities

helps to optimise land utilisation in favour of economic development of the region.

VI. CONCLUSION

The analysis undertaken in this paper seems to suggest that primary education working force explains the variations in land utilisation in agricultural activities and higher educated working force explains land utilisation variations in manufacturing activities. This specific relationship indicates that demand of primary education, at minimum level, is higher for agricultural and that of the higher education is for industrial development of the region.

This analysis also seems to suggest some qualifications which should attach for estimation of land use complexes by economic activities and educational impact on them which are taken into account.

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INDEX OF BDS/BER, VOL. II, 1974

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as a Result of Neo-Capitalistic Development.

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Articles

- 93 An Analysis of Per Capita Foodgrain Availability, Consumption and Requirements in Bangladesh : A Systematic Approach to Food Planning
Lincoln C. Chen
- 127 Developmental Strategies and the Quality of Production under Socialist Economic Planning
Jozef Wilczynski
- 153 Poverty, Inequality and Social Welfare : Measurement, Evidence and Policies
Mohiuddin Alamgir
- 181 Dynamics of Migration in a Rural Area of Bangladesh
Rafiqul Huda Chaudhury and George C. Curlin

Notes and Comments

- 231 Foreign Capital Inflow and Domestic Savings : A Technical Note
T. Ademola Oyejide
- 239 Possibilities of Fertilizer Substitution for Land in Paddy Production
B. L. Mishra and D. K. Marothia
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An Analysis of Per Capita Foodgrain Availability, Consumption and Requirements in Bangladesh : A Systematic Approach to Food Planning

by

LINCOLN C. CHEN*

I. INTRODUCTION

Short-range food planning is a common exercise in much of the developing world today. The optimism of the late 1960's over the adequacy of the world's food situation was dealt major setbacks in 1972 and 1974 when widespread drought and monsoon failure of flooding crippled foodgrain production in much of South and Southeast Asia and sub-Saharan Africa [49,pp.634-38]. International market prices of foodgrain escalated and world-wide food reserves became rapidly depleted. The precariousness of the food situation, particularly in chronic food-deficit developing nations, continues and prospects for the immediate future are uncertain.

An illustration of this predicament is that which Bangladesh faces. Over the past 20 years Bangladesh has experienced a considerable deficit of foodgrain production requiring correspondingly large quantities of imports [22]. With a population of 75 million growing at a faster rate than domestic foodgrain production, this food gap has been widening, and both in 1972/73 and 1974/75, the food problem reached critical proportions. The victim of successive disasters (the cyclone of November 1970, the civil war of 1971, monsoon failure in 1972 and flooding in 1974) with cumulative consequences superimposed upon a worldwide food shortage, Bangladesh was and continues to be threatened with a

*Lincoln C. Chen is a Staff Associate of the Population Council on loan to the Ford Foundation in Bangladesh as its Program Officer for Population and the Social Sciences. The views expressed in this paper are those of the author and do not necessarily represent the position of either organization.

major nutritional disaster [19; 27]. Of paramount importance to Bangladesh, therefore, is short-range planning and a critical ingredient in this planning is the simple question : what is the food need of the population ?

The importance of the quantitative aspect of this question is shown in the following computation. Accepting the widely-used assumptions of a population of 75 million and an average per capita daily cereal need of 15.0 ounces,¹ Bangladesh would require 11.5 million metric tons of foodgrain in 1972/73. If aggregate availability from domestic production were 8.6 million metric tons, importation of 2.9 million metric tons would be needed to avert hunger. Note that the two independent variables in determining aggregate needs are population size and per capita needs. Should the per capita value be adjusted to 14.5 ounces per person per day, a 3.3 per cent decline, the annual need would fall to 11.1 million metric tons. Such a modification would represent a food saving of 400,000 tons or 14 per cent of total imports. Moreover, at 1973 international market prices of wheat (approximately \$200 per metric ton), this 3.3 per cent alteration would be equivalent to \$80 million in foreign exchange.²

Traditionally only one approach has been employed to estimate per capita needs. Utilizing recent historical data on domestic foodgrain production and imports, planners have computed food balance sheets to estimate total availability of foodgrain to the population. Given a stated population and knowledge of gross amounts available, per capita availability has been calculated. This measure provided a baseline upon which judgements about current and projected food requirements were made.

An important limitation of the food balance sheet (availability) approach is that it is entirely supply-oriented [7]. Gross amounts produced and imported may not be consumed or metabolically utilized by a population. Availability figures therefore usually assume that unrecorded or unofficial net movement of foodgrain across international boundaries is negligible and that the amount lost due to seed, feed, wastage, and storage can be approximated. More importantly, the use of a single approach places

¹ This illustration and its associated assumptions are precisely those that were used by some observers for Bangladesh for 1972/73 [44].

² We recognize that sound nutrition involves more than foodgrain which provides primarily calories. Although protein, vitamins and minerals are important, the focus in this paper is on calories (energy); for good reason, since foodgrain is the primary short-range concern of chronic food deficit nations. In a situation where caloric needs are unmet, proteins are preferentially metabolized by the body as calories and used to fulfil energy needs.

an over-reliance on one type or one set of data. Production-import statistics in Bangladesh are often internally inconsistent and of uneven quality, requiring computational assumptions to arrive at an estimate of per capita availability.

Less commonly employed by planners are two complementary demand-oriented alternatives. The first is an assessment of recent individual or household consumption patterns. Consumption data are usually obtained by dietary sample surveys [18], and to arrive at national averages, survey data can be extrapolated to the nation as a whole. Another demand-oriented approach is to compute physiologic requirements (biological demand) for energy (calories) based on internationally accepted standards for human beings of different age, sex, body weight and for populations living in different environments and experiencing varying levels of physical activity [21].

It is the aim of this analysis to illustrate the advantages of using these three independent yet complementary approaches to estimate the per capita foodgrain needs of Bangladesh.¹ More specifically, this study aims: to analyze the validity of production-import data and the food balance sheet approach, to review the limitation of data from consumption surveys, and to compare and reconcile findings from these two methods with requirements calculated from physiologic standards.

An important feature of this analysis is the recognition that these approaches do not measure the same parameter. Food balance sheets estimate the quantity of food available to the public after deduction of losses from gross production and imports. Consumption levels relate to the reported amounts of food actually purchased or cooked in a household or among individuals. In the third method, physiologic requirements indicate the caloric needs of a population based on scientific standards that may be applied to any human population. The distinction between these three parameters is important, for not only may their values differ but, more importantly, their simultaneous measurement provides three independent views of a nation's food situation.

For the sake of clarity and for the purpose of comparability, this study will deal only with the food situation in Bangladesh from 1960 to

¹ Some confusion may be created by the overlapping definitions of need, availability, consumption, and requirements. In this paper, requirements refer specifically to physiologic requirements while availability and consumption relate to levels of food available to or consumed by a population. The word need is used as a general term, not necessarily related to any of the three specific terms.

1970. Reasonably reliable statistics on availability and consumption are available for this decade, and this time period constitutes a convenient benchmark for planning in the early 1970's. During the decade, rice formed the major portion of foodgrains for Bangladesh followed distantly by wheat [5].¹ Domestic production consisted almost entirely of rice while most imported foodgrain consisted of wheat. For the purpose of this analysis, however, both of these staples will be considered together as foodgrain or cereal.

II. FOOD BALANCE SHEETS

Statistics on per capita availability of foodgrain during the decade of the 1960's show a significant variation. In Table I are presented the per capita cereal availabilities of each fiscal year and of the weighted average of the decade according to three independent estimates. Also included in Table I is our estimate based on considerations presented in this paper. The three sources are selected because they demonstrate well the problems of availability estimates generated from production-import data. The lowest average for the decade is computed by Alamgir and Berlage of the Bangladesh Institute of Development Studies (BIDS)² while higher estimates are reported by Hesser of the U.S. Agency for International Development (USAID) and by a Mission of High-Level United Nation (UN) Consultants led by Ambassador Erna Sailer [2, pp. 25-58; 26; 45]. While only 1.7 ounces separate the highest from the lowest decade averages, an availability of 15.6 ounces is 12 per cent greater than 13.9 ounces per person per day. Such a difference is nearly four-fold that employed in our earlier illustration.

How are such differences possible? This question becomes especially puzzling when it is appreciated that these three sources had access to and based much of their calculations on data published by official government sources. Since per capita availability is determined by total availability and population size, the simplest explanation would be that different population estimates were employed [6; 12; 46]. The last national enumeration in Bangladesh took place in 1961, and these studies all relied on projections of population size. Depending on the assumptions employed; projections could give varying estimates of population size during the 1960's. The population figures utilized by these sources, however, were essentially identical and the divergence in per capita availability

¹ Total foodgrain produced and imported for the decade consisted of 99.2 million metric tons of rice (94 per cent) and 6.0 million metric tons of wheat (6 per cent) [5].

² Formerly Bangladesh Institute of Development Economics.

can be traced to a more fundamental difference, namely the varying estimates of total availability.

Variations of total availability are due primarily to varying estimates of gross domestic production of foodgrain; the quantities of imported foodgrain are reasonably similar. Production estimates differ in part because agricultural production statistics for Bangladesh have been gathered by two different methods and have been expressed as at least three different values [2,pp.25-58]. The first method is called "subjective" and is based on estimations by local officials of production at the union level (average size 16 square miles). Based on observation and interview, agricultural officers report on union acreage and yield figures for each of three annual cereal crops (*aman*, *boro* and *aus*). These data are then aggregated at the thana, district, and national levels. Since 1962/63 for yields and since 1964/65 for acreage, however, an "objective" method using sample survey technique and crop-cutting experiments has been employed. This technique involves the scientific sampling of selected sites to arrive at acreage and yield estimates for the nation as a whole. Figures by the subjective and objective methods may be different from "official" statistics. Since 1964/65, for example, official production estimates of the *aus* crop have been by the objective method, while for the *aman* crop, the official data have fluctuated between the subjective and objective estimates.

In their estimates of domestic production, Alamgir and Berlage relied heavily on the objective figures, extending them retrograde by regression analysis for the early 1960's when only subjective data were available [2,pp.25-58]. USAID and the United Nations, on the other hand, accepted official data, and official values were consistently higher than those obtained by the objective method.

Although differences in gross domestic production account for most of the variability in per capita availability, the three sources also employed different procedures for calculating the contribution of imported and publically distributed foodgrain to total availability. Shown schematically in Figure 1 is a framework to assess the varying computation methods. Gross domestic production yields net domestic production after a deduction for loss due to seed, feed and wastage (usually computed at 10 per cent). All of net production is available to consumers except a small fraction which is placed into gross government stocks through local procurement. Gross government stocks consist of procured and imported foodgrain. After a deduction for storage loss (usually computed at 5 per cent), gross stocks become net stocks and these are also available to consumers. For

the sake of clarity, we assume no year-by-year change in the size of reserve stock in Government stocks; that is, all imported and locally procured food in a given year is distributed that year except for storage loss. The quantity and rate of release of net stocks are recorded in offtake or public distribution figures. The sum of net production and offtakes is equal to total availability. When divided by population size, total availability becomes per capita availability. Private stocks are neglected from this pathway. If they are significant, they can be included simply into the scheme without disturbing its basic characteristics.

Because statistics for the pathway shown in Figure 1 are rarely internally consistent, an investigator is usually forced to make computational assumptions. The simplest calculation method is that used by Hesser of USAID which ignored all variables except production and imports; total availability was estimated by summing net domestic production and total imports [26]. Note that this assumed accurate import data and did not consider potential storage losses. Alamgir and Berlage, on the other hand, utilized domestic production, local procurement, and offtake figures [2, pp.25-58]. In this procedure, total availability was equal to net domestic production minus local procurement plus offtakes. Import data were assumed to be reflected in the offtake figures. The accuracy of this method depends on the reliability offtake data.

In Figure 2, the reliability of one official set of annual offtake figures are assessed by comparing them with the corresponding annual quantity of imports and local procurement. If offtake figures approximate the net addition to gross government stocks (import plus procurement),¹ the points for each year should fall on a line drawn at 45°. The points plotted in Figure 2 show that with the exception of one year official offtake rates were consistently less than the rates of import and procurement.

In a situation where imports are increasing with time, such as in Bangladesh, a lag or time delay in offtakes could theoretically account for this discrepancy. Figure 3 shows that this explanation is insufficient to account for the relatively lower offtake values. In this figure, cumulative quantities of offtakes and additions to gross government stocks are plotted for 1960/61 to 1969/70. The cumulative offtake curve consistently lags behind the government stock curve. Over the 10 year period, a total of 8.6 million metric tons were added to government stocks and only 5.6 million metric tons were recorded in offtake figures. Three million metric tons of foodgrain (35 per cent), therefore, were imported

¹ A storage loss of 5 per cent does not alter the basic pattern shown.

and procured but not officially released over this decade. Storage losses (at 5 per cent) could not possibly account for this gap. Given the Government machinery associated with imports (foreign exchange, donor groups), it is likely that import figures were reasonably accurate and this by exclusion means that offtake figures were biased toward lower levels. Some of this unaccounted for food could have been diverted through private channels, but regardless of the pathways involved, this food eventually reached the public at large either through public distribution or private transactions.¹

The fact that data on offtakes are inadequate seems to be recognized by the United Nations which employed a different computation method [45]. The United Nations followed the entire scheme as shown in Figure 1 but avoided offtake figures by assuming that public distribution (or offtakes) equaled imports plus procurement minus storage losses. Stocks unaccounted for by offtake figures were assumed to have been distributed. In essence, this procedure inflated offtake figures to an expected level given the amounts imported, procured, and lost to storage.

The preceding analysis permits us to recompute availability for the decade of the 1960's. While some investigators have accepted "official" statistics on domestic production, "objective" estimations appear to be based on more scientifically collected data. Some of the computed differences are due to differing calculations methods and the use of some offtake figures may be misleading. Based on these considerations, we have recomputed per capita availability for the individual years of 1960-70 and for the weighted average of the decade (Table I). In these calculations we rely upon objective estimates of domestic production and circumvent the need for offtake figures by using import data. Availability consists therefore of the sum of net domestic production and total imports. Storage loss in government stocks is assumed to be negligible. The computed values in Table I all lie within the range of the three illustrative studies and the decade average is 14.4 ounces per person per day.

III. FOOD CONSUMPTION SURVEYS

The primary source of food consumption data for Bangladesh is

¹ These offtake figures are only inaccurate in the sense that considering them alone does not provide for full accounting of all imported and procured food. We do not intend to imply that illegal means were employed to divert publically purchased food to private channels. Rather we do not know what factors are responsible for this discrepancy. Poor record keeping of offtakes could be one of these factors. To add to the confusion offtake and public distribution data from different agencies of the Government may be inconsistent [1, pp.387-408;5].

the National Nutrition Survey conducted from March 1962 to January 1964 [33]. The Survey sample included approximately 15,000 randomly selected individuals living in all districts of Bangladesh. Estimates of food intake were obtained by weighing before cooking all foods prepared in a household over a 24-hour period. The average daily per capita intake by food groups is shown in Table II [28,pp.426-41]. The consumption pattern suggests that the average Bangalee diet is poorly balanced, being heavily dependent upon cereals. Starchy-staples provide nearly 70 per cent of the dry weight of all foods consumed. In terms of energy, the dominance of cereals is even more pronounced with rice and wheat contributing 84 per cent of the total caloric intake. For the nation as a whole, the Survey estimated an average per capita caloric intake of 2,224 daily, about 1,868 coming from cereals. This amount of calories from cereal is equivalent to a consumption of 18.5 ounces of cereals per capita daily, exceeding by a significant margin levels of foodgrain availability presented earlier.¹

A critical examination of the methodology and findings of the National Nutrition Survey, however, reveals a number of deficiencies that may have inflated consumption estimates [51,pp.29-44]. The first was the use of a single 24-hour observation period for determining household intakes. Within the Survey report itself a comparison of 24-hour versus three-day food weighings in a selected population showed consistently higher daily intake levels for the briefer observation period. For all nutrients measured, the 24-hour estimate (first day) exceeded the three-day average. The inflation rate was about 5.2 per cent for calories. It is possible that an observation period longer than three-days would have suggested that surveys lasting at least one-week are required to minimize bias introduced by daily variations [4,p.304;18;20].²

¹ 84 per cent of 2,224 calories is 1,868. One ounce of rice is equivalent to 101.2 calories and one ounce of wheat is equivalent to 94.7 calories [20]. An ounce of a mixture of 94 per cent rice and 6 per cent wheat is equal to 100.9 calories. This and all subsequent calculations are based on this conversion rate.

² The appropriate length of observation required for dietary surveys is difficult to determine. While most investigators advocate at least seven-day observations to take into account day-to-day fluctuations within a week [4,p.304;18;20], others have demonstrated that single or three-day observations correspond very well with results obtained by longer periods [31,pp.480-85;48,pp.90-96]. The most appropriate conclusion is that precision in relation to length of observation probably varies between different investigators, methodologies, and for varying geo-cultural regions. It is at all time a preferable for a dietary survey to build in internally consistency checks to examine this issue for each specific study.

Another temporal variable, season of observation, may have also led to inflated consumption estimates. There is every indication that foodgrain availability and consumption in Bangladesh are subject to seasonal variation [33]. This variation is reflected by well-documented seasonal fluctuations of cereal prices and is presumably related to the timing of the harvest of the major cereal crop in the *aman* season (November) [10,pp.243-68]. Since the districts in Bangladesh are not homogeneous with respect to their consumption levels (the surplus districts in the Northwest consuming far greater than average) sampling of higher consumption districts immediately after the harvest could be expected to overestimate average annual levels [38]. This in fact is precisely what the Survey did. The less-densely settled and surplus districts of Rangpur, Dinajpur and Kushtia were all sampled shortly after of the *aman* harvest (December-April) possibly registering higher than average consumption for these districts and thus for the nation as a whole.

Another and perhaps more important bias of the Survey is probable underenumeration of individuals in the sampled households [42,pp.27-43]. The undercount of infants and children in particular is a common deficiency of demographic censuses and could be associated with dietary surveys as well. In Table III, we make an attempt to correct for possible undercount by disaggregating the Survey data into districts.¹ The percentage of the undercount by district is estimated crudely by assuming that a complete count would have resulted in an age-sex distribution resembling the corrected 1961 Bangladesh population reported by Bean, Khan and Rukanuddin [6]. Deficiencies by 5 year age-sex groups up to age 15 years were computed and published consumption levels were corrected for undercount. By weighting the districts according to population size, an average adjusted consumption level of 17.6 ounces per person per day is calculated. This average would be reduced to 16.8 ounces per capita daily if the three extremely high consumption districts (Dinajpur, Rangpur and Kushtia) where reported intake exceeded known food supply by more than 25 per cent are excluded [38;42,pp.27-43]. With another 5.2 per cent reduction for a 24-hour versus three-day observation, the corrected average per capita consumption level according to the survey would be 15.9 ounces daily. This figure is still higher than availability estimates.

This value is also higher than intake levels estimated by national household income and expenditure surveys conducted by the Central

¹ This Table only deals with rural data. Since 95 per cent of Bangladesh's population resides in rural areas, these computations can be considered to reflect the nation as a whole.

Statistical Office in 1963/64, 1966/67, and 1968/69 [39]. In contrast to the single round National Nutrition Survey, these consumption-expenditure surveys obtained data on a quarterly basis by questionnaire on household expenditure patterns. Shown in Table IV are the daily per capita consumption levels for Bangladesh during three survey years.¹ Average foodgrain purchased (including food produced and consumed within a household) per person per day ranges from 13.8 to 15.5 ounces, very similar to our availability estimates. It should be noted that availability and consumption during 1963/64 are higher than normal because of a bumper *aman* crop.

The findings of these expenditure surveys are also possibly biased due to population undercount and recall lapse but errors caused by seasonal fluctuations of food intake and brief observation periods would be less pronounced. For both food weighing and expenditure consumption surveys, however, an additional bias of purposeful manipulation of facts by respondents is possible. For example, in the case of food weighing surveys, the bias is often inflationary because families want to present a favorable image [7;20]. When detailed income-expenditure information is obtained by a Government or official organization, respondents may minimize assets and earnings either to avoid taxation or to improve their chances for welfare benefits. Overall, however, one would have to place greater confidence on the findings of the expenditure surveys because of the consonance of their results with availability estimates.

IV. FOOD REQUIREMENTS BASED ON PHYSIOLOGIC STANDARDS

Based on standards derived from physiologic and empirical evidence, the energy requirements of a population can be computed. The internationally accepted methodology is that recommended by a recent joint World Health Organization/Food and Agriculture Organization expert committee on human energy and protein requirements [21]. In Table V is presented a computation of daily per capita energy (calories) requirements for Bangladesh. The calculated average per capita caloric

¹ Weighting of rural and urban data by Alamgir and Berlage, 1973 [1, pp.387-408].

requirement is 1,589 daily.¹ If cereals were to constitute 84 per cent of this total, this would imply a foodgrain requirement of 13.2 ounces per person per day. In Appendix I is the justification for the continuing use of 84 per cent as the caloric contribution of cereals to total energy intake and in Appendix II is an analysis of the relative importance of various factors in determining a lower requirement for Bangladesh as compared to developed societies. It should be noted here that this energy estimate is considered adequate to meet the needs of the average person in Bangladesh. Some individuals are expected to need less and others more than the average requirement, but in a population these surpluses and deficits should cancel each other. Also these requirements are not "minimal", but are considered sufficient to cover the entire population.²

The computed average energy level is shaped by five factors unique to Bangladesh: the age-sex structure of the population, its anthropometric characteristics, climatic conditions, the physical activity level of the population and special nutritional needs during pregnancy and lactation. The age-sex structure employed in Table V (column a) is of Bangladesh in 1965, the midpoint of the decade. This distribution is taken from demographic projections (Assumption II) by Bean, Khan and Rukanuddin based on an adjusted 1961 population from that in 1965, errors in the age-sex distribution are assumed to be small.

The average body weights by age and sex (column b) are derived from three sources. For boys and girls up to age 19 years, weight data are from measurements of rural children by the National Nutrition Survey [33]. For adults the weights are taken from estimates made by Revelle and Thomas [42, pp.27-43]. These adult values fit extremely well with unpublished weight data of treated patients admitted to the Cholera Research

¹ This per capita requirement for Bangladesh is less than that recommended for India by the Indian Council of Medical Research [24]. There are several factors responsible for this difference. First, the Indian computations are based on standard body weights that are significantly heavier than Bangladesh's. Secondly, an extra allowance is provided to growing Indian children ages 5-14 years not considered for Bangladesh. The rationale for this omission is discussed later. Most importantly, the Indian values are "recommended allowances" rather than "requirements". The former is higher than the latter to provide the population with more than the averaged required to cover those individuals in a population who may need more than the average level.

² Meeting a requirement does not imply an elimination of malnutrition since actual distribution of food and other factors such as malabsorption, parasites and disease are also important.

Laboratory in Dacca. Moreover, in cross-national comparison, these estimated weights for Bangladesh appear to be reasonable. Average weights of Bangalee infants and children are within the range reported for Indian boys and girls by the Indian Council of Medical Research [30, pp. 612-17; 43]. Not unexpectedly, however, Bangalee children consistently weigh near the lower limit of the Indian range. The adult Bangalee weights are also similar to those in poor, rural Indian communities and to those of Burmese adults [11; 36, pp. 804-809].

The calories required per kilogram of body weight are the recommended physiologic standards for any population except for one modification for environmental temperature. Because the average temperature in Bangladesh is at least 20° C higher than the standard of 10° C, the requirements have been reduced downward by 6 per cent. Although there is some controversy about adjusting requirements upwards when the average temperature is below the standard of 10° C, a downward adjustment of 3 per cent per 10° C for warmer climates is generally accepted. Some studies also implicate humidity in climatic modification but because the effect of humidity (independent of temperature) is probably not large and is poorly quantitated, its effects are not considered here.

Another modification is for men and women between the ages of 10 and 59 years where levels of physical activity are assumed to be higher than the standard of moderate activity applicable to more developed societies. Although virtually no scientific data are available on this subject for Bangladesh, one can safely assume that Bangladesh's agrarian, labor-intensive economy demands a higher level of physical work than more developed and industrialized nations. The adjustment for physical activity (activity factor) depends upon two variables: the percentage of the population by age and sex involved in increased activity and the postulated level of increased activity.

To compute the per cent of the population involved in greater than moderate activity, we employ in Table VI the 1966 Bangladesh labor force participation rates (Projection II) published by Bose [9, pp. 371-98]. Since we are primarily interested in agricultural labor, all age-sex participation rates are reduced by 15 per cent, the overall per cent of the labor force recorded as being involved in non-agricultural occupations by the 1961 census. For agricultural workers in the age groups 10-19 and 40-59 years, we assume that activity levels are "very high". And for the more active ages of 20-49, we postulate "extremely high" levels of physical activity. Using the recommended World Health Organization/Food and

Agriculture Organization procedure, we can calculate activity adjustment factors for each age-sex group [7]. The formula employed is :

$$A. F. = \frac{(100-p)-pA}{100}$$

where A. F. = activity factor

p = per cent of population in age-sex group involved in increased levels of activity

A = 1.17 for "very high" activity level

A = 1.34 for "extremely high" activity level.

As shown in Table V, these corrections for increased activity raise requirements by 7 per cent for the population overall. For the most active men (ages 20-39 years), a 26 per cent increment is computed. It should be noted that this increment of 26 per cent is a weighted average for the entire age group. In other words, "extremely active" (agriculturally employed) men from ages 20-29 get more than the average increment (2,539 to 2,704 calories), while those either unemployed or involved in non-agricultural employment receive the standard allowance for moderate levels of activity (2,015 calories). The requirement of 2,704 calories daily per "extremely active" male worker is consistent with findings from empirical studies. Murthy and Belavady, for example, reported that Indian agricultural laborers in energy balance were consuming 2,400 to 2,700 calories daily [37,pp.977-97], and extremely active of 2,677 calories per day [36,pp.804-809].

The final adjustment is to allow sufficient energy for pregnancy and lactation. These allowances are provided under the requirements for infants from 0 to 1 and children 1 to 4 years of age where caloric needs are computed independently of body weight. An allowance of 1043 per infant was arrived at in the following manner. According to vital statistics (1969/70) collected by the Cholera Research Laboratory for a rural region of Bangladesh, the ratio of the number of livebirths annually to the midyear population of infants under age 1 year is 1.06 [15;16;17]. Since the energy requirement of a full term pregnancy is 80,000 calories, this supplemental allowance works out to 84,800 calories (80,000 times 1.06) per infant per year. To this allowance we add another 9,900 calories to account for fetal wastage, assuming that an average fetal loss requires 30,000 and the ratio of fetal loss to livebirths is 33 per 100. The total supplement for pregnancy therefore comes to 94,700 calories per infant annually or 260 calories per infant per day.

To this supplement an additional lactational allowance of 750 calories per day are added for children under 6 months and 960 are added for infants from 6 to 12 months. If one assumes that half of all infants are under 6 months of age, the requirement for lactation averages to 850 calories per infant per day. In total the figure of 1,110 calories (260 plus 850) per infant per day represents the energy supplement for pregnancy and lactation. This figure is adjusted downward by 6 per cent for climatic differences, arriving at 1,043 calories per infant per day.

A lactation allowance similar to that of heavier children from developed countries is provided to children in the age group 1-4 years. In Bangladesh breastfeeding commonly extends beyond the second year of life and may be as long as four years [13]. For this reason, the requirements for children in this age group are not reduced from the standard allowances of heavier children in developed societies. These standard allowances, however, are adjusted downward by 6 per cent for climatic differences.

Although recommended by the World Health Organization/Food and Agriculture Organization expert committee, allowances for catch-up growth of children ages 5 to 14 are not provided in Table V. The rationale for excluding this allowance is straightforward. Catch-up growth is a theoretical possibility in Bangladesh provided sufficient nutrients were given to growing children. Under this circumstance, it would be a long-term proposition. The concern of this analysis is with what is needed today, not for nutritional improvement but to avert nutritional disaster.

This computation of requirements is also not free of limitations. Human energy requirements consist chiefly of two components: basal energy demands for resting metabolic function and the energy cost of physical activity. While international guidelines compute caloric need as proportional to body weight, there is conflicting evidence over the relative importance of body surface area [34, pp.103-107; 50, p.1383]. Since much of the energy spent in physical activity consists of moving either the body or its parts the energy cost of physical work can be expected to be proportional to body weight and to the level of work performed. The main problem with these two components is that there are comparatively few empirical studies on energy balance in the tropics [3, p.471; 6; 25, p.305; 47, p.732]. International guidelines are primarily derived from results obtained in temperate climates on people of Caucasian genotype. Applying these uniform standards, even with appropriate

correction, to tropical developing nations carries a significant degree of uncertainty.

V. DISCUSSION AND CONCLUSION

In contrast to the use of a single method, the systematic approach employed in this analysis provides a more comprehensive view of a nation's food situation. Three aspects of this systematic approach deserve comment. First, simultaneous but independent measurements of per capita food needs minimize over-reliance on a single method with its associated data, methodological and other deficiencies; and these limitations of a single approach are sufficiently serious to hinder an accurate discrimination by planners of small yet critical differences in the level of per capita food needs. Secondly, it is recognized that the food need of a nation is not a single value. Rather, it is a range of values with associated social, economic and health benefits and costs. The incorporation of demand-oriented approaches to a supply-oriented food balance sheet method contributes to a better understanding of this spectrum. Third and most importantly, consumption and requirement analyses introduce the important concept of food distribution. Distributional aspects of food constitute a critical part of any sound food plan.

Before examining these three issues, it is important to understand that conceptually availability, consumption and requirements mark different milestones in a nation's food pathway (Figure 4). The quantity of foodgrain available to consumers represents the total amount produced and imported with approximate deductions for seed, feed, wastage and storage losses. The amount of cereals purchased (or produced and consumed within a household) is measured by expenditure-consumption surveys. This type of consumption may be less than availability by the amount lost in small transactions of marketing, transport and storage. Food weighing nutrition surveys measure the quantity of cereals actually cooked within a household. These measures may be less than expenditure-consumption levels by the magnitude of household losses with storage, spoolage and wastage.

Due to nutrient loss in cooking and leftovers, the number of ingested calories may be less than what is actually cooked. Furthermore, these ingested calories may not approximate the energy available to and metabolically utilized by the body because of malabsorption, parasitic infestation, and disease [29;35,p.868]. Physiologic standards only identify the energy requirements of populations; it does not consider nutrient loss [21]. Requirements, for example, can be equated with

ingestion only if malabsorption, parasites and disease do not interfere with the utilization of all calories consumed and if there is no change of body weight, representing no net gain or loss of energy.

With this framework, we are now able to compare and reconcile the findings from the preceding analysis of availability, consumption and requirements in Bangladesh. During the decade of the 1960's the daily per capita cereal availability in Bangladesh averaged 14.4 ounces. Levels of availability and expenditure-consumption in the three years of the decade in which consumption data were collected both averaged 14.6 ounces. This close proximity of availability and expenditure-consumption levels suggests that nutrient loss between these two figures is negligible. Clearly at variance with this figure is the average intake of 18.5 ounces reported by the National Nutrition Survey. Adjustments for probable population undercount, brief observation periods and seasonality of measurements modify this value to 15.9 ounces. As this figure is still incompatible with other independent estimates, one is forced to conclude that an artificial inflation is attributable to purposeful manipulation of facts by respondents possibly to present a favorable family image.

Per capita physiologic requirements are computed at 13.2 ounces daily. If one accepts the assumption that Bangladesh was in reasonable energy balance during the decade, this requirement suggests that 1.2 ounces (14.4—13.2) per person daily of available foodgrain were not metabolically utilized by the population. An 8 - 10 per cent rate of nutrient wastage between availability and requirement agrees reasonably well with estimates for more developed countries [21]. One can only guess that for a developing nation such as Bangladesh, leftovers and cooking losses would be less and malabsorption, parasites and disease losses would be more than those of a developed nation.

This analysis therefore indicates that an average per capita availability of about 14.5 ounces daily is a reasonably safe level for Bangladesh. Provided planners were willing to accept an unimproved state of nutrition in the population, such a level could be expected to sustain the population over a long-run, such as a decade. Furthermore, there is some evidence that a further reduction in the short-run (say, one or two years), though not recommended, could be tolerated by the population. The key to this suggestion is the variance of the decade average. Year-to-year fluctuations of availability and consumption during the decade varied as much as 20 and 12 per cent respectively. In one year, 1962/63, average per capita availability was only 13.1 ounces per day and a

level less than the average was maintained for as many as three consecutive years (1960/61 to 1962/63 and 1964/65 to 1966/67). Similar year to year fluctuations were observed by three expenditure consumption surveys. In 1963/64 average per capita intake was reported as 15.5 ounces daily while in 1968/69 it was low as 13.8 ounces.

There are other lines of evidence, external to this study, that suggest short-term plans for foodgrain need not be as high as the decade average of 14.4 ounces. As cogently advanced by Bose, famine was averted in Bangladesh during the war of independence in 1971, a period when per capita availability fell below 14.0 ounces daily [8]. Moreover, in some comparable regions of South Asia, availabilities are even lower than these recommended levels. India and Ceylone averaged 12.6 and 12.1 ounces per person per day, respectively in the mid-1950's [41]. The recent per capita caloric intake in three poor Indian States of West Bengal, Kerala and Tamil Nadu ranged from 1,498 to 1,927 and their respective per capita cereal consumption levels were 14.9, 12.0 and 12.6 ounces per day [23]. These levels were well tolerated by populations with similar anthropometric, climatic, activity, and demographic characteristics as Bangladesh's population.

Just as year-to-year fluctuations offer insights for short-range planning, the variance or distribution of food within a population also contributes new dimensions. A supply-oriented approach tells a planner virtually nothing about the distribution of food between different socio-economic groups, regions, rural-urban areas, or even between members of a single household. Demand-oriented methods, on the other hand, are at least partly concerned with and capable of elucidating the dispersion pattern of food in a society.

The Bangladesh expenditure-consumption survey in 1966/67, for example, showed significant variations in per capita intake between low and high income groups [39]. Families earning less than Rs. 100 per month (24.1 per cent of sample population) were consuming only 12.5 ounces per person per day as compared to 16.6 ounces for families earning more than Rs. 200 per month (35.3 per cent).¹ The National Nutrition Survey, despite the limitation of seasonality of measurement, reported marked regional heterogeneity in consumption levels [33]. Sparsely-settled food surplus districts in the Northwest had considerably higher consumption levels than more densely-settled districts in central Bangladesh. Physiologic requirements of a population are computed by allocating

¹ The Bangladesh Taka has now replaced the Pakistan Rupee as currency.

appropriate quantities of energy according to biological need to specific age-sex groups. These are further modified according to levels of physical work and the reproductive status (pregnancy and lactation) of mothers. On a per capita basis, the requirement of some age-sex groups are over two-fold those of others. Yet, there is empirical evidence that actual distribution of food deviates widely from these guidelines. Intake levels of infants, children, and lactating or pregnant mothers in Bangladesh, as elsewhere, are considerably lower than biological demand [33] ; these groups therefore are most vulnerable and at highest risk to nutritional disorders.

What becomes clear, after appreciating the distribution issue, is that food planning is a complex business, intimately related to a host of public policies and programs ; and some of these activities may not even be directly related to food. Consumption differential by income groups, for example, may be responsive to food price policies or those that affect income distribution, such as employment policies. Programs that intensify local procurement in surplus areas and public distribution (e.g., rationing) in deficit areas obviously counterbalance regional disparity. More equitable distribution of food to vulnerable age-sex groups depend not only on programs (nutrition, education, public feeding) but also on socio-cultural factors. In this context, food planning becomes a far more complex exercise, one that exceeds the scope of this analysis.¹ Despite this complexity, a meaningful and necessary first step for effective planning is a systematic examination of availability, consumption, and requirements.

¹ Systematic food and nutrition planning that attempts to make a long-range impact on malnutrition involve far more complex models than the one presented in this paper [7; 13; 32].

TABLE I
DAILY PER CAPITA FOODGRAIN AVAILABILITY (OUNCES)
IN BANGLADESH DURING 1960-70

Fiscal Year	BIDS (a)	USAID (b)	UN (c)	Our Estimate (d)
1960/61	13.6	16.4	16.0	14.3
1961/62	13.3	15.3	15.6	13.8
1962/63	12.7	14.4	15.2	13.1
1963/64	15.6	16.6	16.2	16.0
1964/65	14.1	15.1	15.7	14.1
1965/66	13.7	15.4	15.6	14.3
1966/67	13.2	13.8	14.2	13.8
1967/68	14.2	15.4	15.3	14.9
1968/69	13.8	15.3	15.6	14.2
1969/70	14.3	16.2	16.4	15.0
Decade Weighted Average	13.9	15.4	15.6	14.4

Sources : a. Alamgir and Berlage, 1975 [2].
b. Hesser, L. , 1971 [25].
c. Sailor, E. , 1972 [44].

TABLE II
DAILY PER CAPITA INTAKE OF FOOD IN BANGLADESH
(1962-64)

Food Groups	Quantity		Calories	
	Grams	%	No.	%
Cereals	527.9	63.2	1,872	84.2
Pulses and Nuts	27.9	3.3	107	4.8
Fats and Oils	6.6	0.8	56	2.5
Fish	33.3	4.0	46	2.1
Vegetables	134.6	16.1	41	1.8
Starchy Roots	54.3	6.5	33	1.5
Sugar and Sweets	7.5	0.9	19	0.5
Fruits	10.6	1.3	3	0.1
Meats	6.4	0.8	10	0.5
Eggs	1.7	0.2	3	0.1
Milk and Cheese	19.2	2.3	17	0.8
Miscellaneous	4.9	0.6	14	0.6
All	834.7	100.0	2,224	100.0

Source : National Nutrition Survey 1962-64 [32].

TABLE III
ADJUSTED PER CAPITA CEREAL CONSUMPTION IN RURAL
BANGLADESH (1962-64)

Districts	Sample Size	Per cent 1961 Population in District	Population under Count (Per cent)	Cereal Consumption (ounces/person/day)	
				Published	Adjusted
	(a)	(b)	(c)	(d)	(e)
Rajshahi	670	4.94	3.44	21.1	20.4
Barisal	631	8.38	3.61	17.9	17.2
Pabna	542	3.85	3.89	19.3	18.5
Sylhet	677	6.86	5.69	18.6	17.5
Chittagong	587	6.62	4.53	19.0	18.1
Dinajpur	479	3.36	8.96	25.4	23.1
Rangpur	616	7.47	5.63	22.6	21.3
Comilla	655	8.63	6.34	17.1	16.0
Faridpur	520	6.25	9.61	15.5	14.0
Bogra	571	3.10	4.94	20.5	19.5
Jessore	681	4.31	2.84	16.2	15.7
Mymensingh	581	13.80	4.19	18.6	17.8
Kushtia	453	2.29	5.26	24.3	23.0
Dacca	941	10.02	5.81	17.6	16.6
Khulna	702	4.82	3.53	16.5	15.9
Noakhali	1293	4.69	8.89	17.8	16.2
Weighted Average				18.5	17.6

Source: National Nutrition Survey 1962-64 [32].

TABLE IV
DAILY PER CAPITA CEREAL CONSUMPTION IN BANGLADESH
(1963/64, 1966/67, 1968/69)

Year	Simple Population	Ounces per Person per Day	
		Expenditure Consumption	Our Availability Estimate
1963/64	23,868	15.5	15.9
1966/67	31,550	14.8	13.8
1968/69	30,159	13.8	14.2
Three Year Weighted Average		14.6	14.6

Source: Government of Pakistan Central Statistical Office, Report of the Quarterly Survey of Current Economics in Pakistan, Household Income and Expenditure (1963/64, 1966/67, 1968/69) [38].

TABLE V
REQUIREMENTS OF CALORIES IN BANGLADESH

[illegible]

TABLE VI
COMPUTATION OF ACTIVITY FACTOR FOR BANGLADESH (1966)

Age—sex	Popu- lation (mill.)	Labor Force (mill.)	Per cent in Labor Force	Per cent in Agri- cultural Labor Force	Activity Factor
Males					
10—14	4.53	2.63	58	49	1.08
15—19	2.73	2.22	81	69	1.12
20—39	7.85	11.32	89	76	1.26
40—59	4.17				1.13
Females					
10—14	4.52	0.59	13	11	1.02
15—19	2.74	0.47	17	14	1.02
20—39	7.71	2.20	20	17	1.06
40—59	3.54				1.03

Source (Labour Force Statistics): Bose, S.R., 1963 [9].

TABLE VII
PRODUCTION OF NON-CEREAL FOODS IN BANGLADESH, 1960-1970

(thousand tons)							
Year	(X)	Pulses	Oils	Fish	Vegetable	Potato	Cereals
1960/61	(0)	127	39.5	223.4	573	338	8937
1961/62	(1)	133	49.7	236.8	548	331	8860
1962/63	(2)	131	50.7	242.8	563	357	8660
1963/64	(3)	127	44.3	248.2	599	319	10920
1964/65	(4)	129	43.5	254.5	647	395	9940
1965/66	(5)	137	46.4	258.7	665	486	10353
1966/67	(6)	157	52.2	261.9	693	591	10300
1967/68	(7)	151	63.0	265.3	788	701	11407
1968/69	(8)	165	69.9	268.9	867	787	11180
1969/70	(9)	172	67.8	259.7	89.7	851	12137
a		120	40.0	232.0	505	231	8705
b		5	3.0	4.0	40	63	347
Decade							
Per cent							
Increase		33	67.0	17.0	71	245	36

Source (non-cereal statistics): Ministry of Agriculture, 1973 [5].

Source (cereal statistics): Alamgir and Berlage, 1973 [2].

TABLE VIII
ESTIMATED REQUIREMENTS OF CALORIES FOR A TYPICAL
DEVELOPED NATION

Age-sex	Per cent Popu- lation	Average Weight (kg.)	Daily Calorie Requirement		Total Calorie Requirement 100 Persons
			Cal./kg.	Cal./Person	
	(a)	(b)	(c)	(d)	(e)
Males					
0—1	1.20	7.3	112	818	982
1—4	4.56	14.5	110	1450	6612
5—9	5.31	25.9	83	2150	11416
10—14	4.76	41.6	66	2746	13071
15—19	3.76	61.6	50	3080	11581
20—29	6.09	65.0	46	2990	18209
30—39	6.64	65.0	46	2990	19854
40—49	6.14	65.0	44	2860	17560
50—49	4.92	65.0	41	2665	13112
60+	6.09	65.0	34	2210	13459
All	49.47				125856
Females					
0—1	1.20	7.3	112	818	982
1—4	4.33	14.4	100	1440	6235
5—9	5.15	25.1	81	2033	10470
10—14	4.59	42.2	58	2448	11236
15—19	3.71	53.9	44	2372	8800
20—29	6.14	55.0	40	2200	13508
30—39	6.92	55.0	40	2200	15224
40—49	6.31	55.0	38	2090	13188
50—59	5.09	55.0	36	1980	10078
60+	7.08	55.0	30	1650	11682
All	50.52				101403
Daily Per Capita Calorie Requirement					2272

FIGURE 1

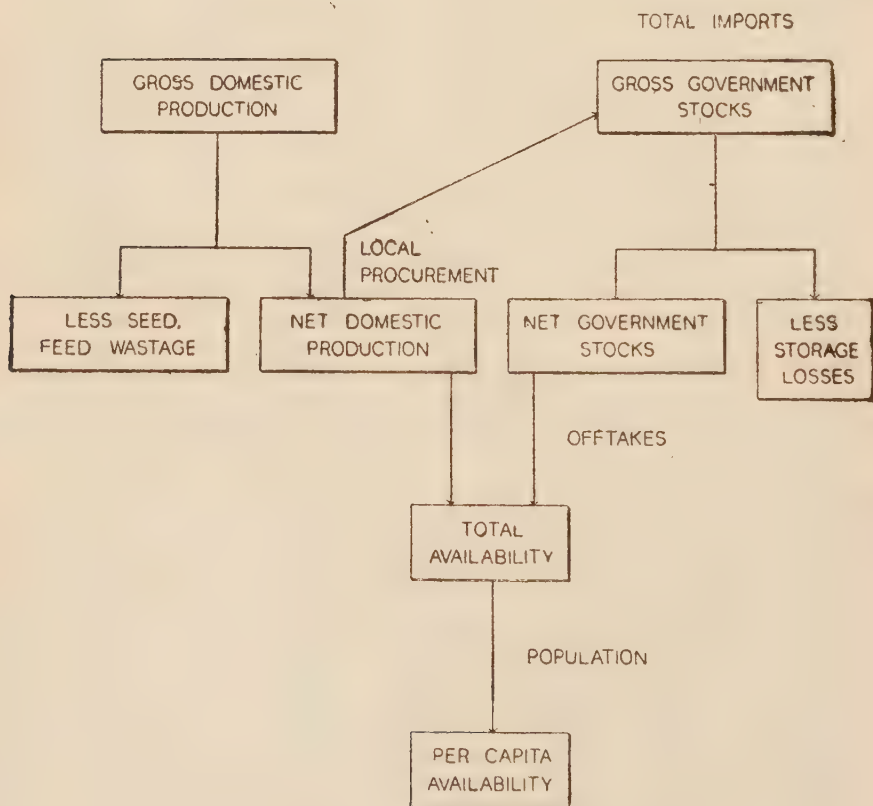
CALCULATION SCHEME FOR PER CAPITA FOODGRAIN AVAILABILITY

FIGURE 2

COMPARISON OF ANNUAL OFFTAKES WITH ANNUAL IMPORTS
PLUS PROCUREMENT IN BANGLADESH (1960-61 TO 1969-70)

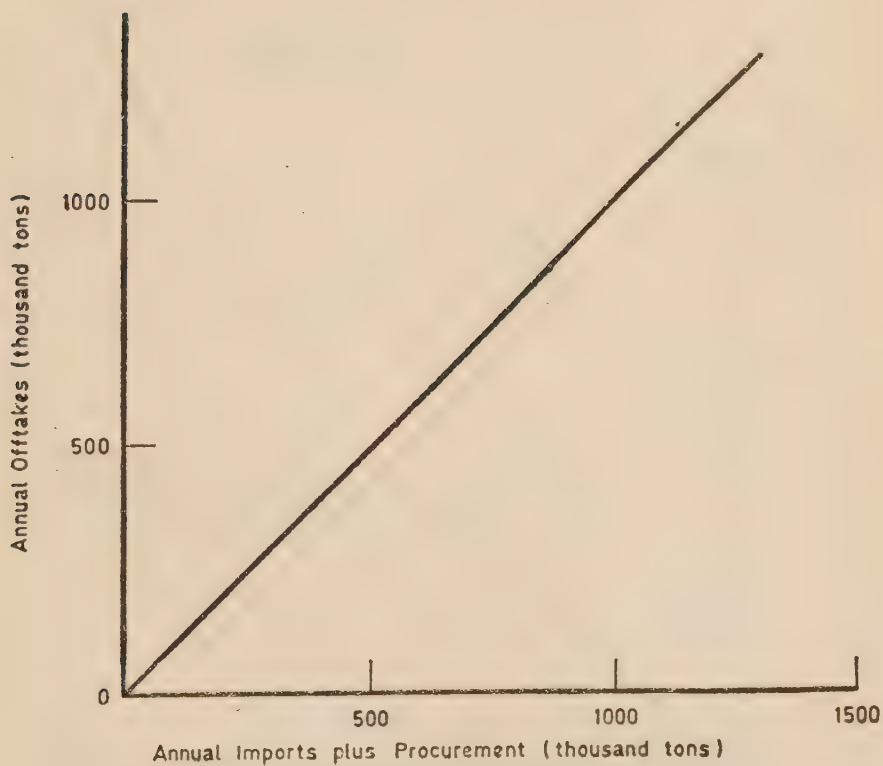


FIGURE 3

CUMULATIVE QUANTITIES OF OFFTAKES
AND IMPORTS PLUS PROCUREMENT IN
BANGLADESH FROM 1960-61 TO 1969-70

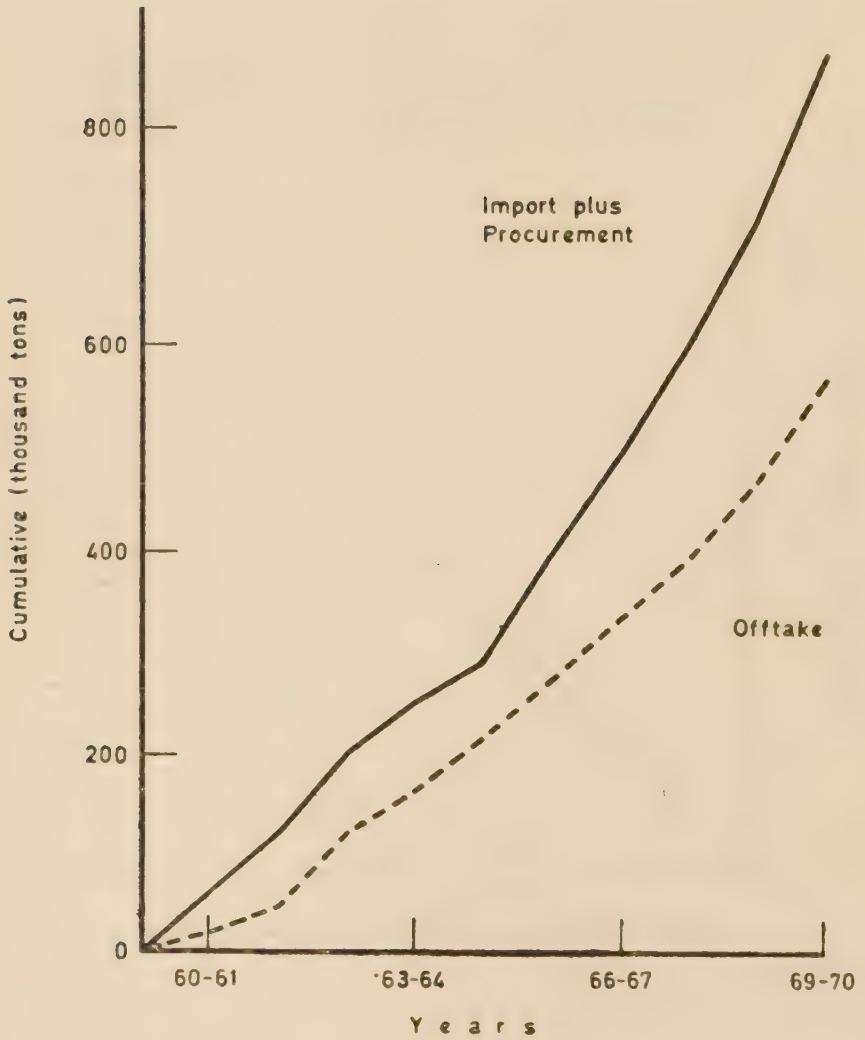
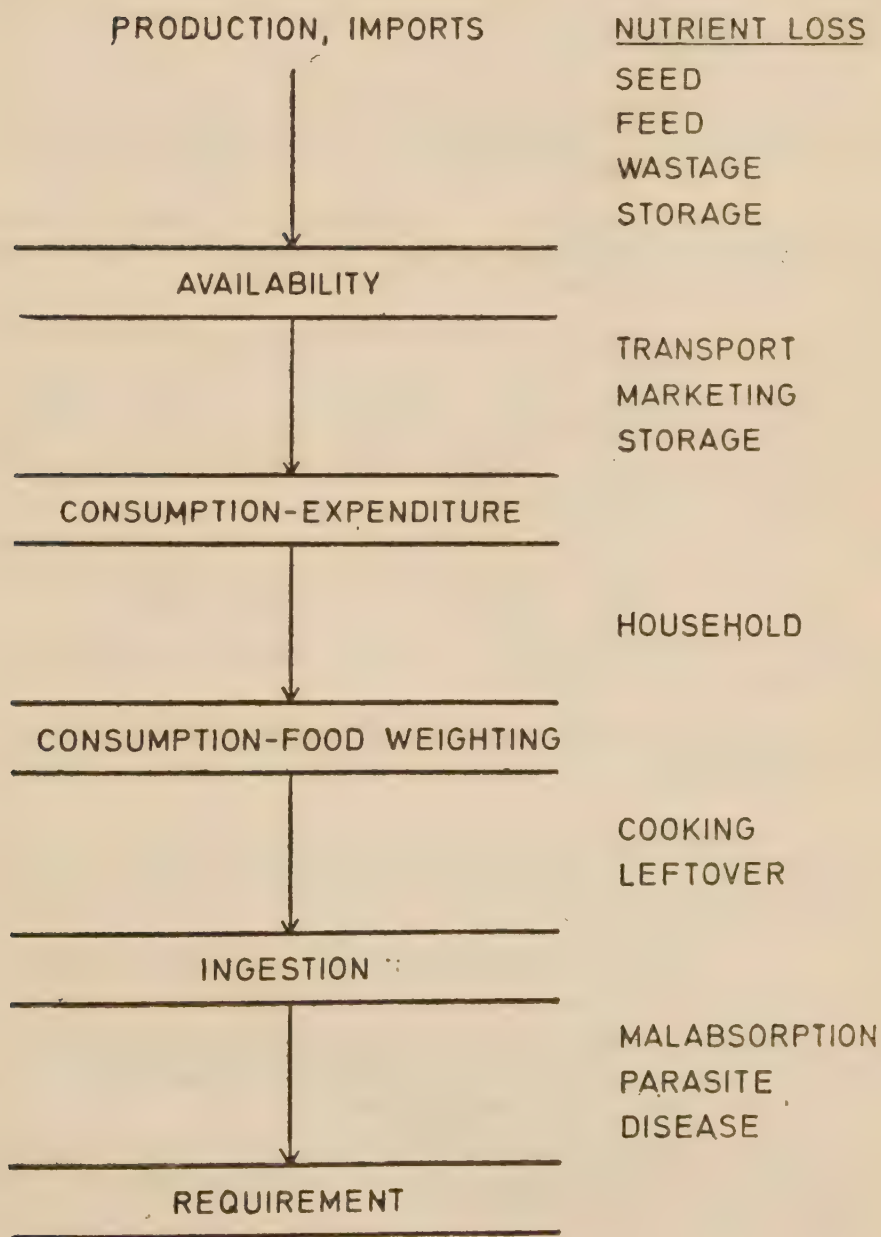


FIGURE 4
FOOD PATHWAY AND NUTRIENT LOSS



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Appendix I

The assumption that the caloric contribution of cereals (84 per cent) to total caloric intake remained stable during the decade of the 1960's implies that the availability of non-cereal sources of calories maintained proportional increases with the growth of cereals. In a country such as Bangladesh where programmatic emphasis is aimed at foodgrain self-sufficiency, it might be difficult for non-cereal products to keep pace; and if this were the case, the contribution cereals to caloric intake could be increasing, thereby increasing the overall requirements of foodgrain.

Official production statistics suggest that this disproportionate growth was apparently not the case [5]. In Table II is shown that the major non-cereal caloric food groups were: pulses and nuts (4.8 per cent), fats and oils (2.5 per cent), fish (2.1 per cent), vegetables (1.8 per cent) and starchy roots (1.5 per cent). The yearly production estimates of the major constituents of these food groups are presented in Table VII. To estimate a time-trend of increases of production, the yearly production figures are fitted to a least-square trend line by linear regression. The formula employed is:

$$y = a + bx$$

where y = quantity on the trend-line (thousand tons)

a = quantity produced in 1960-61 (thousand tons)

b = coefficient or slope of trend-line (thousand tons per year)

x = number of years from base year of 1960/61.

The per cent increase of production by food groups in the decade is calculated by comparing the 1960/61 base-year trend-line value with that nine years later in 1969/70. As shown in Table VII there was a significant increase in the production of all food groups: ranging from over 200 per cent for potatoes to only 17 per cent for fish. The average of these increases, weighted according to their relative contribution to caloric supply, is 69 per cent from 1960/61 to 1969/70. This exceeds by a significant margin the increase of cereal production (including) of 36 per cent. From this analysis one can conclude that if any change in the caloric contribution of cereals took place during the 1960's, it probably decreased rather than increased. This possibility seems to be consistent with the results of a recent study of consumption patterns in a selected rural area (Comilla district) by the Institute of Nutrition at Dacca University [40]. This survey in early 1972 demonstrated that the caloric contribution of cereals was 76 per cent.

The implication of this finding is that if these production trends were maintained in the early 1970's, the assumption that 84 per cent of caloric requirements needs to be met by cereals is a conservative one for computing foodgrain requirements.

Appendix II

One aspect of these requirements that has consistently confounded planners and scientists alike is the very small caloric needs for Bangladesh as compared to more developed regions of North America and Western Europe. In more economically advanced nations, per capita consumption of calories approximates 2,700 daily and computed requirements based on physiologic standards average about 2,300 calories per person per day [20]. The five factors discussed earlier are responsible obviously for differences in requirements. But the question of how much each contributes to the overall difference remains unanswered. A commonly cited factor is varying population age structure. In Bangladesh nearly 50 per cent of the population is under 15 years of age in contrast to about 20 - 30 per cent for more developed (and less fertile) populations. On the average, young children require and consume less food than adults.

We can quantitate the role of age structure and other variables by examining the requirements of a typically advanced nation. In Table VIII, the requirement of a typically developed society is shown. The distribution of population in column (a) is taken from the unadjusted U.S. census of 1960. In contrast to Bangladesh only 23 per cent of the population is under the age of 15 years in this age structure. Average weights in column (b) are the accepted standards of 65 kilogram for adult men and 55 kilogram for adult women. The growth patterns of the children are consistent with these adult standards. Caloric requirements per kilogram of body weight is the recommended allowance and no adjustment is made for climate. The activity level of the population is assumed to be moderate. With these assumption, the computed requirement is 2,272 calories per person per day in contrast to 1,589 calories for Bangladesh, a difference of 683 calories ; the former level is nearly one and a half-fold that of the latter.

The individual contribution of the factors unique to Bangladesh to this difference can be quantitated by substituting relevant variables from Table VIII into Table VII. Using the U.S. age-sex structure of Table VIII, for example, the per capita requirement in Bangladesh increases from 1,589 to only 1,615, a very modest change. The bulk of the difference in requirements appears to be due to body weight. Using the standard 65 kilogram male and 55 kilogram female weight pattern, Bangladesh's requirements would increase to 2,259 calories. Only a

small difference would be due to the lesser effects of climate, activity, and allowances for pregnancy and lactation.

Surprisingly and contrary to general impression, differences in age-sex structure only account for a very small portion of the requirement for Bangladesh as compared to more developed nations. What has been poorly appreciated previously is that differences of demographic structure do not apply only to the proportion of children under age 15 years, but other shifts in age-sex distribution also exist. While it is true that Bangladesh's population has a greater proportion in the younger ages, the structure of more developed nations has counterbalancing factors. The U.S. male-female ratio, for example, is 0.98 as compared to 1.06 for Bangladesh, and females require fewer calories than males. More importantly, the U.S. population has 23 per cent of the population above age 50 in contrast to 10 per cent for Bangladesh. Older people on the average require fewer calories than young adults. Because of counterbalancing forces the net effect of all of these age-sex structure changes, therefore, is very small.

Developmental Strategies and the Quality of Production under Socialist Economic Planning

by

JOZEF WILCZYNSKI*

I. QUANTITY AND QUALITY IN DIFFERENT STAGES OF ECONOMIC DEVELOPMENT

The size of a country's national income is determined not only by the quantity but also the quality of production. The former is relatively easy to measure as it can be expressed in simple physical terms (unit, weight, length, areas, energy and the like) but naturally several problems arise in ascertaining the latter as the relevant criteria may not be easily quantified.¹ The concept of quality lends itself to different interpretations. For the purposes of this study four aspects warrant being singled out :

- (a) **The Quality of the Model (or type).** The degree of suitability of the ideal prototype of the product in relation to the users' requirements (with regard to reliability, durability, aesthetic appearance, novelty etc.).

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¹The most general (microeconomic) definition of quality is that adopted by the (Rotterdam-based) European Organization for Quality Control, viz. "the degree to which a product meet users' requirements". On the other hand the All-Union State Standards of the USSR describe quality as "a set of characteristics determining the performance of defined requirements". The former definition refers implicitly to the demand side whilst the latter to the laid-down indicators of primary use to the testing authorities. As such, these definitions roughly reflect the traditional approaches to the verification of quality in a capitalist market economy and under socialist central planning.

- (b) **The Quality of Execution and Workmanship.** The degree to which the article has actually been produced in accordance with the model concerned.
- (c) **Market Quality.** The degree to which a given product meets the requirements of the market in confrontation with the buyers' preferences.
- (d) **Optimal Quality.** The level and pattern of quality which is in the best interest of society.

Although the postulate of attaining and maintaining the highest possible quality standards is usually taken for granted, its validity may be questioned from the standpoint of the long-run macrosocial interest. Both quantity and quality compete for society's scarce resources, each representing cost. The improved quality of a product may be accomplished at the expense of its quantity, or the quality improvement of some products in the economy may be achieved by reducing the output of others. In other words, in a society where resources are essentially limited, there is a relationship of substitutability between quantity and quality.¹

In a capitalist free-enterprise economy the patterns of quality are essentially determined by the market. Two anti-social forces, relevant to our subsequent discussion, are at work and operating in opposite directions. Firstly, the production (and import) of goods and services is disproportionately influenced by the preferences of the higher income groups in favour of high quality (including luxuries). Secondly, the debasement of quality is often resorted to by unscrupulous producers as a means of profit maximization; this is particularly evident in the case of planned obsolescence and goods produced on a mass scale without adequate quality control and further disguised by misleading advertising — practices which are more common in the higher stages of economic development.

The capacity as well as the need for high levels of quality are obviously more limited in the lower stages of economic development. On the one hand the stock of resources and technological know-how is relatively small and per capita production is low. The attainment and

¹ In essence this generalization still applies even if there are unemployed resources in the economy or there are inflows of resources from abroad, as in utilizing them society is still confronted with the "cost" of the forgone alternative (the social opportunity cost).

maintenance of high quality is likely to involve the heavy social cost associated with the necessary research and development (R & D), the improvement of inputs, quality control and the honouring of guarantees not to mention shorter production runs and the withdrawal of obsolete goods.¹ The steeply rising cost of improving the quality of a product (in terms of the required standards of reliability) at different levels can be illustrated by reference to the electronic industry as represented in a Polish source (see Fig. 1).

At the same time in the lower stages of development the need of society as a whole for high quality is less pressing. With low per capita incomes, the capacity of a large majority of consumers to purchase high-quality goods is narrowly circumscribed and similarly the structure of the economy is relatively unsophisticated. Consequently, the requirements for high-quality consumer as well as producer goods are not as exacting.

The situation tends to be reversed in the higher stages of economic development, when society has a larger reservoir of resources and technology at its disposal. The need for high and rising quality—both in the sphere of consumption and production—becomes increasingly pressing. Similarly, the capacity of the economy to meet such requirements also increases owing to a greater abundance of resources, a more solid R & D base, a more elaborate industrial structure, more effective methods of production and greater productivity in general.

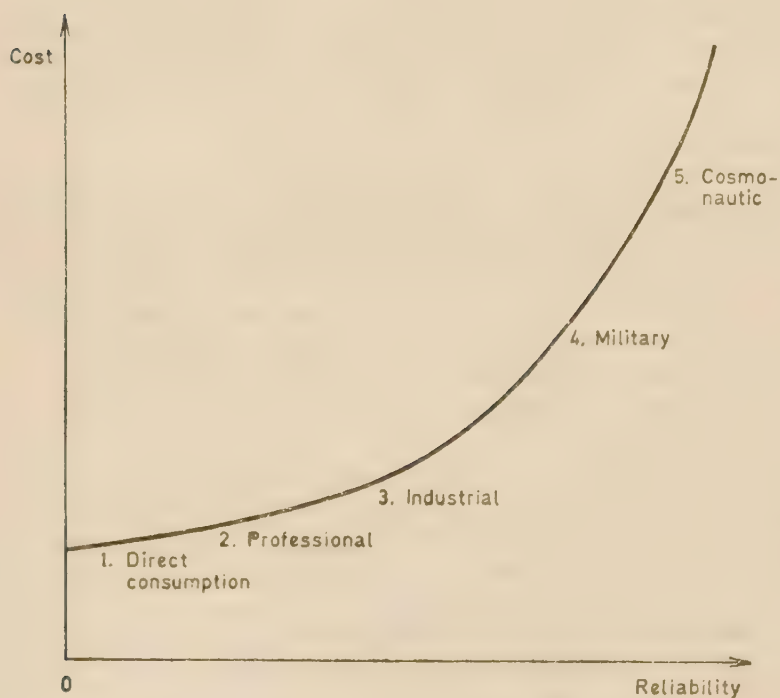
The possible alternative rates of substitution of quality for quantity at different stages of economic development are shown in Fig. 2. Q indicates the situation before the take-off in the Rostowian sense, and the stages of economic development are roughly represented by progress away from Q. An economy embarking on accelerated development is confronted with several possible courses. The growth of the volume of production may be accompanied by a constant rate of quality improvement, which may be higher, the same, or lower than the rate of the quantitative growth (QA, QB, QC). Or quality may be maintained at the same initial level (QD) or allowed to deteriorate (QE).

In a capitalist free market economy—noted as it is for large differences in the distribution of personal income and an unrestricted preference for immediate consumption—the likely course to be followed is that exemplified

¹ Thus under Polish conditions as reported several years ago, the improvement for the quality of many type of machines in terms of production efficiency by 20—30 per cent involved increased costs by 2—3 times [15, p. 117].

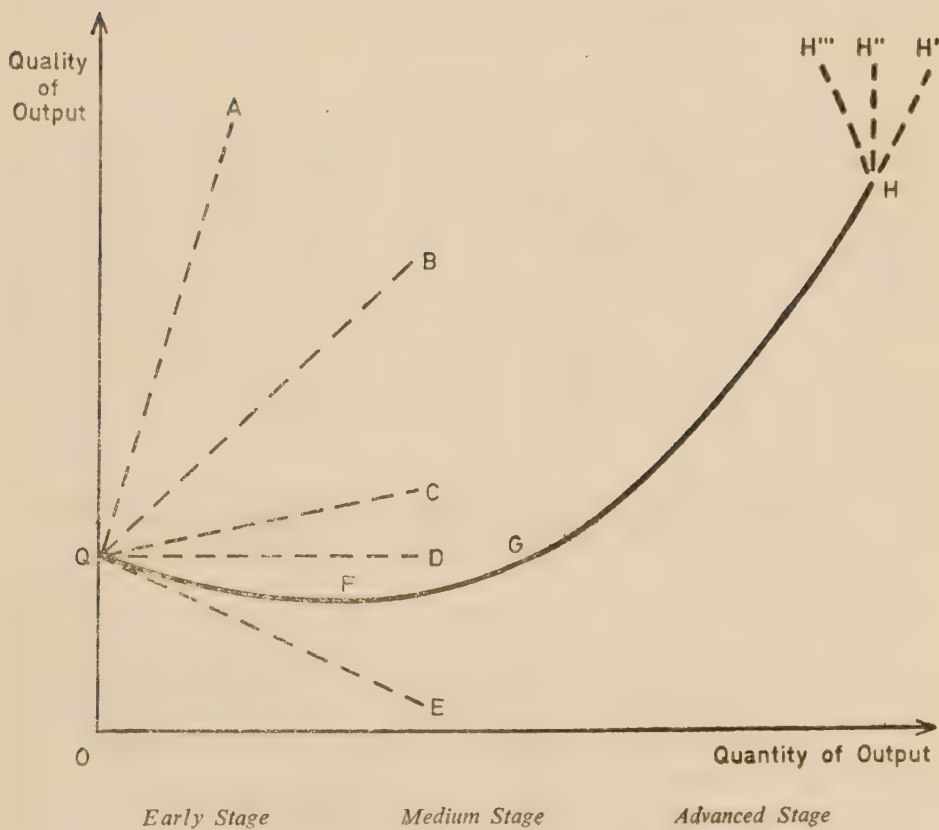
FIGURE 1

THE REQUIRED DEGREE OF RELIABILITY AND PRODUCTION COSTS OF A GIVEN TYPE OF ELECTRONIC EQUIPMENT MANUFACTURED FOR DIFFERENT USES



Source : S. Pietras, *O jakości wyrobu* (On the Quality of Products) Warsaw, 1971, P. 158.

FIGURE 2
THE OPTIMAL QUALITY CURVE IN DIFFERENT STAGES OF
ECONOMIC DEVELOPMENT



by QC, or some other curve radiating from Q and located between Q' and D. On the other hand, in the context of reasonably even personal incomes, central planning and the determination to speed up economic development, the optimal path may be that indicated by QFGH. In a poor society, with very low per capita production and low savings a rapid growth in the volume of output—even at the expense of reduced overall quality (as represented by QF in Fig. 2) may be of long-run macrosocial advantage. Such a policy not only produces egalitarian effects but also releases resources for investment in the critical period when the capital-intensive infra-structure and basic industries have to be radically expanded or established to provide solid foundations for sustained rapid development.

However, beyond a certain stage (indicated by G in Fig. 2), society's trade-off between quantity and quality increasingly swings in favour of quality, so that quality improvements proceed at faster rates than the quantitative growth. In fact, a stage may be reached when all economic progress is realized only via improving quality (HH") imaginably, at very high income levels, society may find that its welfare may be maximized by shifting some resources from quantitative to qualitative growth when a reduction in the volume of national income may be more than offset by quality gains.

II. EXTENSIVE GROWTH AND THE CENTRALIZED DIRECTIVE SYSTEM OF PLANNING AND MANAGEMENT

Economic growth can be derived from two types of sources—from the physical extension of the resources employed (labour, land, capital) on the one hand, and from overall productivity increases (consequent upon improvements in the quality of resources and of methods and organization of production, and economies of scale) on the other. These sources are described in Socialist economic thought as "extensive" and "intensive" respectively.¹ In the case of extensive growth production

¹ These concepts were first introduced by K. Marx (*Capital*, Moscow, 1957, Vol. II, ch. XVII, esp. p. 320), but they have received serious attention from socialist economists only since the late 1950's.

normally increases proportionately to the increase in the factor of production.

The measures resorted to in the Socialist countries¹ to maximize the extension of resources were directed to all three factors. The supply of labour was maintained at high levels by the policy of continuous full employment, the encouragement given to women to go to work, transfers of underutilized labour from agriculture and domestic service to industry and by long working hours. Large proportions of national income, ranging roughly from 20 to 35 per cent, (using the Western basis of national income accounting) were reserved for investment at the expense of current consumption. Special efforts were also made to put extra land under cultivation (such as the Virgin Lands in the USSR in the latter 1950's).²

Yet there were prevalent shortages of resources caused by an excess demand for both investment and consumption purposes. The shortages were accentuated by rigid controls over prices and wages, generally below equilibrium market levels, which tended to induce extra demand and discourage economical use. This became most obvious in the case of capital which (up to 1964-66³) was allocated to enterprises free of charge, and of land, the use of which (in the form of differential rent) was not accepted as cost. This situation produced acute sellers' markets for both the factors of production as well as consumer goods.

The contribution of the extensive sources to the total economic growth in these countries as a whole over the period 1950-65 typically represented about three-quarters. This share was on the whole increasing in the latter part of this period when nine-tenths and even more was reached in several countries.⁴ In developed capitalist economies extensive sources of growth usually represent about one-third.

¹ The countries considered here include the European Comecon countries—Bulgaria, Czechoslovakia, the German Democratic Republic, Hungary, Poland, Rumania and the USSR. They have pursued similar developmental strategies and have embarked upon major economic reforms since about the mid-1960's.

² For further details see the author's *Socialist Economic Development and Reforms*, London, 1972, esp. pp. 26—39.

³ Capital charges, ranging from 3 to 6 per cent p. a. of the value of fixed and (in all countries except Poland) circulating assets, were introduced in Bulgaria and Hungary in 1964 and in Czechoslovakia, the German DR, Poland, Rumania and the USSR in 1966.

⁴ For evidence, see [8, pp. 1115—17; 19, p. 220; 20, p. 30; 33, p. 4].

The pursuit of the extensive growth strategy in the socialist countries was facilitated by the existence of the centralized, directive system of planning and management. The system was noted for hierarchical levels of authority where production targets were laid down in detail and imposed from above on enterprises. Even methods of production were prescribed and enterprises had little independence. Targets were set almost exclusively in quantitative terms and they were unduly high in relation to the known available resources ("taut planning").

To further impel the fulfilment and over-fulfilment of quantitative targets, incentives were devised in the form of moral and material rewards and penalties. An extreme case illustrating this approach was the practice followed in Poland over the period 1957-60, when the over-fulfilment of the planned targets by a given percentage qualified the enterprise to the same percentage increase in the base salary fund of the managerial and technical staff, i.e., an increase in the volume of output was confused with an increase in productivity; in 1960 the scale was modified according to which the over-fulfilment of targets by 1 per cent entitled the personnel to bonuses representing 0.5-0.6 per cent of their base salary [26,p.803]. In the case of under-fulfilment, according to the practice administered in Poland in the late 1960's, the enterprise bonus fund was reducible by 20 per cent for every 1 per cent of the under-fulfilled plan, and if the plan was under-fulfilled by more than 5 per cent no allocation was allowed to the bonus fund [7,p.299]. This obsession with quantitative growth at all levels became known in socialist terminology as the "fetishism of output".

Economic growth based predominantly on extensive sources was not peculiar to the socialist countries alone. Extensive growth is typical of countries in the lower stages of economic development through which the present leading industrialized capitalist nations also passed (in general, before the First World War). But in the socialist countries, owing to certain doctrinaire tenets and the institutional set-up, this strategy was pursued on a planned basis and to greater extremes, with some adverse repercussions not only on the quality but even the volume of production.

III. THE SOCIALLY JUSTIFIED AND UNJUSTIFIED LOW LEVELS OF QUALITY

The pursuit of the policy of extensive growth in the socialist countries yielded several indisputable benefits. Full employment was maintained continuously, and the lesser concern for the quality of production released

a certain amount of resources for the badly needed quantitative expansion of output.

Over the period 1950-65 the most remarkable growth of production was achieved—nearly twice as high as in the capitalist market economies. According to United Nations sources, the average annual rate of growth of national income (at constant prices) scored by the region as a whole over the period was 8.2, compared with 4.2 in the developed market economies and 4.7 in the developing countries (the respective rates for 1950-60 were even more striking viz., 9.3, 3.7 and 4.6) [35, pp. 99, 112-13]. The rapid expansion of production made it easier to support social welfare programmes, which were developed on a fairly generous scale at the same time, and heavy defence expenditure. A sense of national purpose was infused and the results of the policy could be easily seen even by ordinary workers.

Although the authorities were preoccupied with the maximization of the quantitative growth, they did not deliberately embark on depressing quality. In fact, in some spheres they took special measures to ensure high quality where it was indispensable or highly desirable. Top priority in this sense was given to the space programme, nuclear developments and defence production in general (especially in the USSR). The high quality standards achieved in these spheres are well known. But the civilian sector did not fare as well. High qualitative priority was given to export production especially destined for the highly competitive markets in the industrialized capitalist countries, and to certain investment projects and capital goods on which the continued development of the economy critically depended. In this scale of priorities consumer goods produced for the domestic market, constituting about two-thirds of the total output, in effect became a qualitative residual.

The allocation of resources for the maintenance of quality in the priority spheres was not made lightly, as the consequence on the quantitative growth was always kept in mind. These decisions were made at the top political level, and it appears that no rigorous economic analysis was undertaken in weighing the sacrifice of one for the other.

Central planners naturally insisted on the maximum levels of quality that could be reasonably maintained within the framework of the pre-determined resource constraints. But in reality the deterioration of quality went well beyond the planners' expectations. Obsolete designs, inferior component materials, poor workmanship, defective assembly, faulty installation, crude finishing and inadequate servicing were the

common facts of economic life. These widespread practices were largely due to the following co-incidental elements of the extensive growth strategy :

- (a) The emphasis on piecework, which led not only to poor-quality production but also to higher earnings for unskilled workers remunerated on this basis than to skilled workers paid on a time basis.
- (b) Slack labour discipline induced by the virtual absence of high quality consumer goods, poor working conditions and the ease of finding employment resulting in poor application to work, absenteeism and a high labour turnover.
- (c) An extravagant use of resources, with less attention given to efficiency.
- (d) A neglect of the service sphere, caused by the planned diversion of resources to material production, leading to the poor servicing and maintenance of equipment and buildings, inadequate R & D, inferior commercial service and the like.
- (e) Acute sellers' markets for both producer and consumer goods, noted for the privileged position and intolerant attitude of producers and distributors versus users, with the consequent disruptive bottlenecks, queues and long waiting lists.
- (f) A poor adaptation of the structure of output to users' preferences, as even poor-quality goods can be easily disposed of.
- (g) Sub-optimal patterns of substitution where often the ease of acquisition and not the relative scarcity and productivity or maximum consumer satisfaction govern the utilization of resources and output.

There is ample evidence demonstrating the prevalence of low quality, particularly if comparisons are made with Western countries. Even in Czechoslovakia in the mid-1960's, the country usually regarded as industrially the most advanced Socialist economy at that time only 40 per cent of the products of the machine-building industry measured up to world standards, 40 per cent were partly obsolete and 20 per cent were completely out of date. The respective proportions which applied to the Hungarian machine-building industry were 14,

39 and 47 per cent.¹ In another industrially advanced socialist country, the German DR, the share of new products in industrial output in the early 1960's was less than 5 per cent, compared with 15 per cent in the FR of Germany [11,p.39]. In Poland in the late 1960's, 47 per cent of the output produced in the socialized sector of the industry was rated below acceptable world standards [23,p.94], in the case of some engineering products, such as turning shafts for lathes, the proportions reached 71-76 per cent [12,p.4]. A thorough investigation on the quality of the output in the Soviet machine-building industry carried out in 1965 showed that 31 per cent of the products could not stand up to the quality demands of the world capitalist markets [5,pp.272-73].

Further evidence of the persistence of poor quality is provided by the embarrassingly large, unsalable stocks of goods—which is most revealing, considering the inadequately supplied markets, with continued shortages and the fact that the Comecon public is unaccustomed to being highly discriminating. To illustrate, in Hungary between 1962 and 1969 the size of stocks increased from 8,000 m. to 15,000 m. forints or from 4.9 to 6.5 per cent of national income [25,p.569]. In Poland the actual (and planned in brackets) stocks as percentages of national income for the year between 1961 and 1968 were as follows : in 1962—actual : 5.1 (planned : 5.6), in 1963—7.4 (4.2) in 1964—7.6 (5.2), in 1965—8.3 (5.9), in 1966—8.4 (6.1) and in 1967—6.2 (5.3) [37,p.273]. Estimates made in the socialist countries indicate that in the late 1960's the size of stocks as a percentage of national income was 2-3 times higher in Comecon than in Western Europe [1,p.188; 14,p.3].

According to Y.F. Kormnov, a Soviet authority on intra-Comecon foreign trade, about one-quarter of the USSR's imports of chemical and oil refining equipment from other Comecon countries before the late 1960's was below the level of quality accepted in world capitalist markets [17,p.50]. The low degree of sophistication of these countries' exports is further reflected in the prices received. For example, the average prices received in 1963 per ton of machinery and equipment exported by Poland and certain capitalist countries were : Poland - \$790, Japan- \$1,610, the FR of Germany - \$1,720 and Italy-\$1,830 [17,p.67]. The average prices received per cent of machine tools exported in 1964 were : Rumania-\$1,180, Bulgaria-\$1,400, France-\$2,650 and Switzerland \$4,410 [17]. In the late 1960's the Polish lathes exported to capitalist

¹ These figures were established by the State testing centres in the respective countries. Quoted from [24, p. 128].

countries on the average brought in \$1,200 per ton whilst the average prices for imported lathes worked out at \$5,300 per ton [12,p.4].

The deterioration of quality reached such alarmingly low levels in the civilian sector that the central planners had to introduce penalties for sub-standard production and incentives for quality. But these were relatively weak compared with those applied for the quantitative under-fulfilment and over-fulfilment of targets. Confronted with such alternatives as a Polish economist observed, "it was an economic proposition for enterprises to pay fines for faulty deliveries, rather than attend to quality and avoid penalties but fail to reach the targets and forfeit bonuses" [3,p.23].

Departures from the optimal level of quality involve extra social cost and apply not only to supra-optimal but also infra-optimal directions. It was (and still is) not uncommon that special brigades have had to be maintained in factories merely to rectify faulty production. There are no complete statistics of the losses caused to the Comecon economies by poor quality, but there are some indications that they were enormous. In Poland in 1959 the losses consequent upon the goods supplied by producing enterprises not being up to agreed standards alone were estimated to have been between 4,000m.—6,000m. zlotys, or 1 per cent of total material production [38,p.154], the direct losses caused by faulty products in 1968 were estimated at 3,000m. zlotys, equivalent to the monthly investment expenditure on machinery and equipment in the whole economy (as a result, the profitability of enterprises was on the average reduced by 0.26 per cent) [3,p.25]. But even in the German DR, the country which has reached the highest level of quality of industrial production in Comecon, the annual cost of rectifying faults in the goods under guarantee amounts to 2,500m. marks, which in 1970 represented 4 per cent of total industrial output [34,p.6].

But losses to society derive not only directly from faulty products but also from unsuitability, low durability, crude appearance and in general from a low capacity to satisfy human wants directly or indirectly. There were also what can be described as 'cumulative structural losses', largely a peculiarity of tightly planned economies. The incidence of sub-standard production varied in different industries and from one enterprise to another. Some products could escape quality control more easily than others, and in addition the degree of competence and honesty of the personnel naturally varied in different enterprises. In effect, the actual product-mix turned out by enterprises was often distorted not only qualitatively but also quantitatively compared with the

planned structure. This, under the tight planning conditions prevalent in the past, frequently led to bottlenecks occurring side by side with idle stocks. Thus, it can be seen that a slack quality discipline may adversely affect even the quantitative growth of production.

IV. THE POLICY OF INTENSIVE GROWTH AND THE IMPROVEMENT OF QUALITY

By 1960 it had become evident that the policy of extensive growth had outlived itself. The reservoirs of underutilized resources were drying up and the waste associated with that policy substantially contributed to the stagnation of the early 1960's. Whilst over the period 1950-55 the average annual rate of growth (of national income at constant prices) in Comecon reached 11 per cent, during 1961-63 the rate slumped to about 4 per cent [29,pp.4,16-43] (Czechoslovakia having recorded the most drastic decline).¹ Taking the same periods into account, the investment outlay necessary to support one unit of increase in material production rose in the USSR from 1.5 to 3.7 [28,p.67], in the German DR from 1.5 to 6.2 [18,p.222] and in Czechoslovakia from 1.3 to as much as 11.7 [31,p.62]. In a study carried out by an American economist M. Boretsky, it was shown that although in 1962 the USSR had practically all the technological know-how that the USA had, the Soviets were on the whole 25 years behind the USA in the industrial application and diffusion of technology—in terms of 25 specific indicators selected, the lag ranged from 5 to 40 years. Productivity in the Soviet economy was only 40 per cent of the American level, in spite of the fact that the rate of accumulation in the USSR was three times as high as in the USA. Moreover, Boretsky concluded that the Soviet lag in civilian technology behind the USA was greater in 1962 than in 1940 [2,pp.149-52, 156-59]. The lag of Poland in 1960 was estimated to have been 43 years behind Great Britain or 9 years behind France [40,p.3].

The serious setbacks to economic development and a growing awareness of the technological gap made the Socialist leadership turn to intensive sources of growth, i.e., productivity increases, or technological progress in its broadest sense. The economic reforms embarked upon in these countries since the mid-1960's have been primarily aimed at activating these sources of growth.

In the pursuit of this strategy quality has assumed new, and in fact

¹ 1.4 in 1962, 2.2 in 1963 and 0.6 in 1964, *Statistická ročenka 1967* (Statistical Yearbook 1967), Prague 1967, pp. 132, 136.

critical, significance. First of all, technological progress in the final analysis can be reduced to improvements in quality, viz.:

- (a) Improvements in the quality of resources (more skilled labour, a higher degree of power, durability, precision and functional differentiation of capital and a greater extent of land drainage and irrigation).
- (b) Improvements in the methods and organization of production (more effective management, more advanced specialization and the rationalization of production processes in general).
- (c) Improvements in the quality of products (with regard to weight, durability, design safety, aesthetic appearance and the like).

Second, one of the cornerstones of the new economic system is the strengthened role of material incentives to labour. Experience has shown that merely paying workers more money has little effect, unless there is a solid backing in the form of high-quality goods and luxuries available in the market. The rising levels of personal income are making consumers more selective, and the improving communication with the West is making them more impatient with shoddy goods than ever before.

Third, the socialist countries are in desperate need of hard currencies for the import of Western machinery, industrial plants and licences in order to speed up their technological progress and bridge the "technological gap". This necessitates a radical expansion of exports to the West. In the past, their exports largely consisted of primary products.¹ But such products do not yield much gain owing to the inefficiency of the primary industries in Comecon, further accentuated by steeply rising production costs. These countries have sufficient industrial capacity to step up their export of manufactures. However, they find that world markets are demanding and Socialist goods do not measure up to competition from capitalist suppliers in respect of quality. It is a well known fact that competition in international trade has been shifting in recent years towards quality and the ability to respond to changing conditions, so that the traditional form of competition via prices is no longer sufficient.

¹ Over the period 1966-70, food, crude materials and mineral fuels represented over 55 p. c. of Comecon's total export to the West. The percentage of primary products in world exports as a whole was less than 35 [36, pp, XX-XXXV].

There is a growing body of opinion amongst Socialist economists and political leaders convinced that as in a socialist centrally planned economy the scope for price competition is naturally limited (because large proportions of prices are controlled in one way or another), conditions should be created for quality competition. A Polish expert on quality sees the scope for such competition in an even broader context :

It is reasonable to put forward a thesis that rivalry between socialism and capitalism in the economic arena is inexorably shifting to the quality of production. The Socialist economy is determined to demonstrate its superiority over capitalism, not only in the sphere of the quantitative growth of production (which has largely been solved by socialism) but also in the field of quality [6,p.91].

The efforts to improve quality in the Comecon countries represents a combination of central planning, direction, moral inducement, material stimulation, penalties and other administrative and market instruments. In all these countries there is specific legislation on the improvement of quality. The emphasis in each country naturally differs. Mandatory direction is important in such countries as the German DR, Poland, Rumania and the USSR, but in these countries and more so in Bulgaria, Czechoslovakia and Hungary, financial incentives and disincentives are also relied upon. In general, the extent to which central planning can contribute to the improvement of quality is rather limited. In the process of aggregation, product assortments lose their individual quality characteristics and merely become general categories.

Nevertheless, central planners can and do now promote better quality in several ways. They formulate general requirements and directions of quality improvement and these are taken into account in one way or another at the time of the plan construction. Where hierarchical planning and management still persist, in the process of disaggregation down the line the product assortments are increasingly differentiated, with more precise descriptions of their qualities, methods of production and the technical coefficients production. The distribution of centralized investment (including expenditure on research and development) can be planned accordingly. Although in the past, little attention was given to qualitative aspects in the studies on optimal planning, it appears that this question may be taken up in the future [22,pp.50-60].

In each Comecon country there is now a well-developed institutional set-up for the enforcement of minimum quality standards and for the continuous improvement of quality. Thus in Poland the following bodies

are directly concerned with the maintenance and promotion of high quality standards; the Central Office for Quality and Measures, the Central Commission for Quality Attached to the National Technical Organization (co-operating with trade unions), the Central Office for Product Quality (under the auspices of the Ministry of Domestic Trade and Services), the State Trade Inspection System, the Consumers' Society "Opinion", and the Committee for the Economics of Quality (attached to the Central Council of the Polish Economic Society); in addition there is a well developed network of specialized certification bodies to enforce minimum health, moral, safety and sanitary standards.

The Socialist countries have always paid a good deal of attention to moral (non-material) incentives, and in recent years particular efforts have been made to enlist them in the interest of a better quality of production and service. These incentives are designed to appeal to ideological and patriotic sentiments, professional pride and the craving for social, comradesly and family recognition. They assume such forms as slogans emphasizing quality, press, radio and television interviews with workers who achieve exceptional quality records, factory sessions on the causes of poor quality and methods of improvement, titles (such as "exemplary worker", "quality control expert"), certificates to individual, or groups of workers, factory banners and the like. The fact that under the new economic system enterprises have greater independence enhances the personnel's sense of responsibility and pride of performance.

However, much greater importance is now attached to material incentives. They are linked to enterprise profit which is calculated now on the basis of the output actually sold, not merely produced, i.e., meeting buyers' minimum quality requirements. Workers participate in the general distribution of profits, but in addition they may receive awards for specific quality achievements. In the German DR, effective since July 1972, up to 50 per cent of the proceeds from quality improvement above the planned level of the preceding year may be transferred to the enterprise Incentive Fund for distribution to the personnel [4,p.5].

In Poland before 1965 quality tasks ("indicators") accounted for only 8 per cent of the total number of tasks subject to incentive awards, but since that time the proportion has risen to over 50 per cent [3.p.220]. In 1967 a sum total equal to 5 per cent of the enterprise wage fund could be used for quality awards, which in the case of individual workers could reach 5,000 zlotys a year (when the minimum monthly wage was 800 zlotys); in heavy industry, where the articles

produced are classified into three grades according to quality, workers on piecework could receive incentives equal to 15 per cent of their wages for the products classed in the top grade and 5 per cent in the second grade; 70 per cent of the sum available for quality awards is paid to the workers directly concerned with the production and supervision (and 30 per cent to the managerial and white-collar personnel) [3,pp.225-52]. In the USSR, 70 per cent of the additional profits earned by an enterprise from its products awarded quality marks is left at the disposal of that enterprise, whilst profits on sub-standard production have to be handed over to the state budget [30,p.2]. In addition to cash awards of the types outlined above, the workers concerned may also benefit from special gifts, extra holidays and priority allocation of housing, as well as from collective awards in the form of the provision of child-minding centres financed by the factory, better recreation facilities, group excursions, etc.

In some Comecon countries quality marks have been introduced which are awarded to products of high quality. In the USSR, where quality testing and certification of industrial products was introduced in 1967, by 1971, 4,550 products had been awarded the "seal of quality" (amongst them certain textiles, bicycles, watches, radios, television sets, scientific instruments, electric motors, machine tools, motor vehicles, excavators and rolling mills; in the 1971-75 plan it is envisaged that the number of articles raised to this level of quality will be five times larger [27,p.6;30,p.2; 32,p.1]. Quality marks not only give satisfaction to the enterprises concerned but also increase their profits and the incentive awards to their personnel consequent upon the extension of the market.

Several Comecon countries have gone further by introducing differentiated profit margins according to the quality classification of the articles produced. Certain types of manufactures are classified into grades I (top quality), II (good average quality) and III (inferior quality).¹ Products in grades I and II carry higher than "normal" profit mark-ups, whilst those in grade III are subjected to penalty mark-downs. Thus in Bulgaria, articles awarded the top quality classification receive a 10 per cent mark-up above the basic price (which includes a "normal profit"

¹Grade I usually corresponds to the quality equal to or higher than world standards, grade II—those still capable of competing in world markets and grade III includes those articles which are difficult to sell in world markets. However, in practice it appears that Socialist quality classifications are often quite lenient. In some countries the three grades may bear the respective designations Q (or K) I and II.

mark-up), whilst to sub-standard products a mark-down of up to 20 per cent of the basic price is applied. In the German DR, the mark-ups on good quality range from 2 to 5 per cent of the basic price; a mark-down of up to 10 per cent was administered on poor quality before 1971, but this classification has since been dropped. In Poland products rated in the top and good quality categories receive a profit mark-up of up to 50 per cent higher than the "normal profit" mark-up in the basic price [39, p.98].

In the countries where liberal economic reforms have gone furthest, especially in Hungary and Czechoslovakia, a similar effect is achieved by the so-called "flexible" (or "complex") price system. Under this system, some prices are free to move up to officially set ceilings, some within laid-down ranges, some are allowed to be determined by the market within laid-down ranges, some are allowed to be determined by the market. In 1968, the proportion of products in the four divisions (in the same order) was as follows: the producer prices of chemicals—35, 55 and 10 per cent; the producer prices of processed foods—5, 5, 85 and 5 per cent; and the retail prices of foodstuffs for private consumption—29, 27, 13 and 31 per cent [9, pp.149, 151]. The required levels of quality are more or less reflected in the prices of the goods in the first three divisions, i.e., in effect high-quality products carrying higher profit margins, whilst sub-standard articles cannot be easily sold or have to be disposed of at less than normal profit (including loss).

Penalties may also be applied to workers individually or collectively in the case of defective production, and they are usually differentiated according to the type of industry. In Poland in the electrical engineering industry—one-third, and in metallurgy—one-half, of his bonus may be lost by a worker if his output is found to be faulty, and the bonus may be withheld altogether if breaches of quality standards are too frequent. In some serious cases, up to 20 per cent of the worker's earnings may be forfeited and even prosecution may follow [3, pp.225, 230]. In the USSR in some enterprises, for each 1 per cent of defective output the bonus of the worker concerned is reduced by 2-3 per cent; if 10 per cent of his output is faulty, he loses 50 per cent of his bonus, and if more, then administrative action may be taken against him; in fact in some enterprises no bonus is payable at all if even one unit of output is faulty [5, p.24]. In some branches of industry, if technical quality standards are not met the entire profit made by the enterprise on such products is confiscated and absorbed by the state budget, with the consequent loss of bonuses to the personnel [16, p.47].

There are also penalties for breaches of quality by supplier and—

what is more significant—by the purchasing enterprises agreeing to accept sub-standard deliveries. In recent years such penalties have been increased. Incentives paid to quality controllers are based on the value of the defective output they discover.

Other measures resorted to in the interest of better quality may be briefly stated. Market research, which under the old system was practically non-existent, is now utilized to guide planning and the adaptation of the structure of production to the needs of the market. In some industries the problem of quality is successfully tackled by the application of computers and servo-mechanisms for quality control. Increasing importance is being attached to trade marks as a useful instrument for encouraging higher standards of quality, and to this purpose legislations have been strengthened in the last decade (in such countries as Bulgaria, the German DR, Poland, Rumania and the USSR) to protect deserving enterprises. Beneficial pressure is also exerted by the increasing participation in international trade and some de-insulation of domestic from foreign markets. Exports, particularly to the exacting buyers' markets in Western countries, provide useful quality discipline for exporting enterprises, and similar competition from imports spurs domestic enterprise to better performance. All the Comecon countries have established special foreign trade corporations or offices for the administration of quality control on exports and imports.¹

V. SYSTEMATIC SCHEMES OF QUALITY CONTROL

The measures for quality improvement discussed in the preceding section consist of various instruments and conditions created essentially at the central level. But in addition some systematic schemes have also been introduced, largely on the initiative of the local Communist Party organs, trade unions civic groups or enterprises themselves—naturally followed by wholehearted support from higher authorities. The best known scheme in Comecon is the Saratov System which was developed at the Saratov Machine-Building Works in the USSR.² Its origins

¹ In Bulgaria—*Bulgarkontrola*, Czechoslovakia—*Inspekta*, the German DR.—*Interkontrol*. Hungary—*Mert*, Polcargos, Rumania—*GCO* (Goods Control Office) and in the USSR—the Commodity Export Examination Department of the All-Union Chamber of Commerce.

² Saratov is an important industrial and educational centre with a population of 700,000, situated on the lower Volga north of Volgograd (formerly Stalingrad). Its industries produce metal-working machinery, machinery for the building industry, a variety of electrical machinery and appliances, aviation equipment, precision instruments, chemicals, glass, furniture and many other products. It has 11 establishments of higher learning.

can be traced back to the late 1950's, and by 1963 it was highly commended and accepted by the Council of Ministers of the USSR for wider application. It soon developed into a mass campaign and its extension has been facilitated by the economic reforms of 1965 and 1973-75. It is significant that the popularization of this idea and its implementation in enterprises has been fostered through the Party apparatus rather than the ordinary and rather unwieldy administrative network.

The Saratov System, as it came to be known, was created by B.A. Dubovikov, a Soviet engineer and a leading authority on quality control.¹ Its main features are:

- (i) The introduction of the method in a particular enterprise is preceded by publicity and propaganda design to enlist the personal involvement of the workers and management alike and to strengthen technical discipline in general.
- (ii) The whole cycle of production is meticulously planned, and special attention is paid to the preparation of faultless technical design and documentation.²
- (iii) The traditional passive control is replaced with active quality self-control.
- (iv) The emphasis is on the immediate identification and elimination of the causes of faulty work, in order to prevent the cumulative effect of deficiencies occurring in the earlier phase of production, rather than on looking for the culprit.
- (v) Interest in quality is stimulated by moral and material incentives, and not by direction and punishment; in Dubovikov's own words, "the most dependable control of quality is the worker's own conscience". [5,p.43].
- (vi) Production and quality control are largely combined.

The motto of the Saratov System is:

If you have done it faultlessly from the first—glory to you, if you have corrected all the faults—do not count on glory, if you have passed on a faulty product—bear the responsibility [3,p.163].

¹ He described the Method in his book see [5, p. 29], which has since been translated into most East European languages.

² According to a sample study carried out in the USSR in 1963, 60 per cent of the changes that had to be made in the process of production was due to faulty designs, and in 85—90 per cent of the cases errors in technical documentation were due to carelessness, ignorance of technological processes and the ineptness or poor organization of work involving designers and research workers [5, pp. 45--47, 58 147; 5, p. 43].

The process of quality control and the basis for incentive payments are as follows. A member of the control unit examines a batch of products made by a particular worker in accordance with technical documentation. When he comes across the first faulty product he returns the whole batch (including faultless items) to the worker for re-examination and correction. This time, the worker can pass on the products to the control unit only with the approval of the brigade leader or foreman. Quality reports are open so that everybody can see them, and in fact in some factories they are immediately shown on illuminated notice boards. Workers who are most guilty of defective production may have to explain their poor performance before a meeting. Faultless production is rewarded by incentives amounting to 10 per cent of the worker's base pay.

A worker may be granted the status of quality self-control, when his products are not rejected by the quality control unit for six months. The right is given in the form of a certificate at a ceremony in the factory, and such a worker does not have to hand over his output to the quality control unit but simply passes it on to the next stage of production. The status entitles him to extra income—15 per cent of his base pay, but if he exceeds the production plan by 10 per cent or more and without faults—he may get up to 25 per cent of his base pay in these pickings. The control unit only occasionally samples his output. If faulty products are found, he loses points—which may deprive him of the status of self-control and of the financial advantage. The self-control approach is facilitated under socialism as there is no basic conflict between owners, the management and workers, at least not to the extent it exists in a private-enterprise capitalist economy.

In the late 1960's about 6m. workers in the USSR were employed in enterprises following the Saratov System. It is claimed that this method reduces the time needed for quality control by 20-25 per cent compared with the traditional procedure [3,pp.13,143]. It is also claimed that the adoption of the method leads to a considerable drop not only in faulty production but also in the overall cost of quality control. Thus in the Saratov Lathe Works faulty production fell nearly three times and complaints by 71 per cent; in 1964 alone the cost of correcting faulty production fell by 8m. roubles. In the Moscow design office, *Nija*, the proportion of faulty designs in 1964 was 25 per cent, but by 1967 as a result of the adoption of the Saratov System it was reduced to 8 per cent. The losses caused by defective output in the Kazan Thermal Installation Works had been 715,000 roubles in 1964 (before the change-over to the System) but then the losses fell to 236,000 roubles in 1965 and to 53,000 roubles in 1967 [3,p.166-68].

In some respects the Kanarspi System.¹ Likewise introduced in the USSR, is more sophisticated. It is also known as the Gorky System as it was first applied (in the late 1950's) in several factories producing electronic equipment in Gorky (situated roughly half-way between Moscow and the Urals). This method attaches the utmost importance to the preparation of the designs and documentation and the construction and testing of the prototypes and the associated technological processes. The aim is to produce a perfect model which can then be produced on a mass scale. For this reason it presupposes a well-developed R & D base in enterprises concerned with the production of new articles. Its second distinct characteristic is the insistence on a thorough study and understanding of the model by all the workers associated with the production.

Furthermore, the Kanarspi System involves the rationalization of production technologies and processes, thereby aiming at the creation of favourable conditions for the prevention of defects. Otherwise, the system embodies similar methods employed by the Saratov System—endeavouring to ensure faultless work at each stage of production. The Kanarspi System has not been widely adopted as it may involve considerable initial outlays for its success but it could make a more radical contribution to the improvement of quality than the Saratov System. Other schemes of quality control experimented with and introduced on a limited scale in the USSR include the Complex System of Quality Control (KSUKP), adopted in some factories in the textile and light industries, and the Yaroslav System of Normative Production, introduced in some machine-building establishments.²

A scheme devised in Poland is known as the Do-Ro Method.³ This scheme, in addition to several ideas borrowed from the Saratov System, also embodies some elements of the US "Zero Defects System".⁴ It was first introduced in a spinning mill, *Merinotex*, in Torun in the late 1950's. The creators of the Do-Ro Method emphasize that in that

¹ The term is derived from the first letters of the Russian words—*Kachestvo* (quality), *Nadezhnost* (reliability), *Resurs s pirovykh izdeliy* (mastery from the first).

² For further details, see [10, p. 15].

³ "Do-Ro" is a syllabic abbreviation of "*Dobra robota*" (good job). It alludes to the well-known Polish philosophical and sociological treatise on the quality of work under Socialist conditions: T. Kotarbinski, *Traktat o dobrej robocie* (Treatise on a Good Job), Lodz, 1955.

⁴ For details, see [13].

factory there was no tradition of good workmanship and there were many young, unqualified workers.

This scheme concentrates on the proper approach to the worker by appealing to his pride and the feeling of satisfaction from the performance of good work, and it attaches a good deal of importance to the elimination of tension and fear in worker-management relations. As in case of the Saratov and Zero Defects methods, attention is directed at preventing the cumulative effects of faults committed by the preceding workers in the process of production. Like the Saratov System it relies on quality self-control by the worker himself and on material incentives linked to faultless production. Like the Zero Defects System, it depends on visual publicity and the enlistment of the workers' interests, i.e., the psychological conditioning of the worker to quality. But unlike the US method, it does not necessitate a special administrative unit to introduce it.

The Do-Ro Method is quite flexible and it lends itself to adaptations to suit local conditions. In the Czystochowa Woollen Mill incentives payable to leading workers in different departments for faultless production reported in 1971 were: after the first six months of defectless products the award is 1,000 zlotys (equal to the minimum monthly wage), plus the right to choose the period of annual holidays and a priority allocation of accommodation in the holiday home run by the Mill; a brown Do-Ro model and certificates may also be awarded. After another consecutive six months of defectless performance, the cash award raised to 2,000 zlotys and the privileges still apply as in the previous case. After the third six-monthly period of perfect production, the cash incentive is increased to 3,000 zlotys with the retention of the other privileges plus the right to leave the factory without being searched. Cash incentives can also be awarded to teams of workers, in which case each member receives 200 zlotys [7,pp.342-43].

Since the early 1960's the Do-Ro Method has spread to other enterprises, and more recently the movement has further gathered momentum, apparently with considerable success.¹ There are now Do-Ro clubs in many industrial centres, which *inter alia* organize regional competitions for the title "Do-Ro Establishment". In addition, there are periodical nation-wide contests involving certain branches of Industry (such as food processing and textiles).

¹ Thus at the Truck Factory at Starachowice, where this system was applied in the late 1960's, by 1970, 1,000 certificates had been awarded entitling the holders to quality self-control; losses arising from defective products were reduced over the period 1967-69 from 2.07 to 1.79 p. c. of the value of the factory's output, and the number of technical control staff was reduced by 300, [21, p. 167].

Other Comecon countries have also introduced various more or less systematized methods of quality control. The Saratov System has been applied in several member countries, with some local adaptations, especially in Bulgaria and the German DR. In some of them, such as Czechoslovakia and Hungary, a version of the Zero Defects System has been introduced.

Although a socialist centrally planned economy has several institutional advantages for fostering quality on an organized nation-wide basis, in practical terms the achievements so far have been rather modest. Experience has shown that the responsiveness to moral motivation is often short-lived and the material incentives are not large enough to induce continued effort. Furthermore, old habits still persist. The systematic schemes of quality control have, as yet, been introduced to a limited extent. The figures given for the improvement of quality and cost reduction in certain publicized enterprises look impressive on paper. Whether they are truly indicative of the success of the schemes on a broader scale and with lasting efficiency, it is still too early to say. As the establishments cited represented experiments on which the Party's and public attention was focused one may suspect that in the first wave of enthusiasm the management and workers responded according to expectations, which may not necessarily be the case when the system is extended to less privileged enterprises.

VI. CONCLUSIONS

In a myopic, capitalist free-market economy the trade-off between quantity and quality is not generally shaped in the best long-run interest of society. In the lower stages of development, the sacrifice of quality in favour of quantity may be justified in any type of economy—capitalist or socialist. This may be particularly advisable in the case of a country, (a) which is determined to speed up its economic growth and lay down a solid basis for sustained development (b) when it cannot or does not want to base its development to any significant extent on foreign aid, (c) if it wishes to promote a reasonably equitable distribution of national income and (d) if it is prepared to introduce and maintain at least some controls to correct and supplement the operation of the free market mechanism. But the socialist experience indicates that preoccupation with quantitative growth may be excessive and persist longer than warranted, with consequent adverse effects on economic development and technological progress. Beyond that stage it is in society's interest to increasingly devote resources to the improvement of quality and in this process both plan and market may be utilized.

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Poverty, Inequality and Social Welfare : Measurement, Evidence and Policies

by

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I. INTRODUCTION

A number of studies are available which analyse the sources of growth and also sources of inequality in developing countries [3;16;20;-24;26;35;36]. In this paper it is maintained that the conventional measures of income growth and income distribution do not reflect properly the level of well being of a country at any point of time neither does the intertemporal and spatial comparisons of indices of growth and distribution provide conclusive evidence on the relative welfare of different groups of population. In order to provide a basis for policy formulation concerning income growth and distribution, the existing analytic framework needs to be extended in two major directions ; (i) the measures of income growth and distribution should be such that they can be used to make direct welfare comparisons and (ii) the general analysis of the magnitude of income growth and income inequality must be supplemented by a careful structural analysis in terms of regional distribution and distribution by social groups.

In Section II some conceptual and empirical issues related to the measurement of income distribution are discussed. Alternative measures of inequality are dealt with briefly in Section III. Some empirical results are presented with data from Bangladesh and international comparisons are made on the basis of findings obtained for a

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number of developing countries. In Section IV some policy implications for income distribution and redistribution are brought out and some comments are made on the policy options for developing countries in the latter part of the seventies and the eighties. Finally, concluding remarks are presented in Section V.

II. CONCEPTUAL AND EMPIRICAL ISSUES

In the literature levels of GNP or per capita income are used as indicators of growth and targets of development plans are expressed in terms of rate of growth of GNP and of the components of GNP, although there is some controversy as to whether GNP estimated by using market prices provide a reasonable basis for indicating changes in social welfare. Under certain assumptions, it is claimed that changes in national income at constant prices reflect changes in social welfare. The weakness of this line of argument has also been exposed [15;17;19;29;30]. Use of market prices to evaluate real national income, on the basis of which welfare comparisons are made, is unacceptable because these prices reflect a pattern of income distribution which may not be optimum.¹ Ideally, one should derive a set of accounting prices reflecting optimal distribution of income corresponding to the configuration of goods and services produced in a particular year. Changes in national income at constant accounting prices will then reflect changes in social welfare. Contributions in the literature along this line are far from solving the rather involved conceptual and empirical problems.²

For some developing countries studies have been made on the pattern of income distribution and its changes over time along with the movement of real income per capita of the total population as well of the economically disadvantaged groups in rural and urban areas.³ Given data limitations this approach is perhaps quite reasonable but not very useful from the point of view of policy formulation. The pattern of income distribution and its changes over time are closely related to the level of living of different sections of the population. Income (total and per capita) remaining the same, a more unequal distribution of income

¹ A distribution may be called optimum when no redistribution is possible which will increase total social welfare.

² For some attempts see, [19, pp. 7-8].

³ In the case of total population per capita GDP at constant factor cost is used, as a measure of real income while for individual groups real wages are used. See, for example, [3, pp. 740-60].

(however measured) will indicate a worsening of the living conditions of the lower income group. On the other hand, an improvement in the distribution of income (in the sense of reduction in inequality) may be consistent with a decline in the real income of the poor, if no substantial improvement takes place in the mean income of the total population and also if the redistribution takes place only among the groups of people below the mean income level. Such an outcome is also possible if the relative rates of change in prices is different for different income (or expenditure) groups.

It is therefore not surprising that problems arise in using standard inequality measures for policy formulation. First, the class of welfare functions corresponding to different measures of inequality is highly restrictive [31;33]. Second, the implicit policy measures including income redistribution for reducing inequality may not be politically feasible. Third, some measures of inequality (e.g., standard deviation of logarithms of income) can produce perverse result in the sense that a normally unacceptable redistribution—from a poorer person to a richer person indicates reduction in inequality [31,p.1458]. In the context of growth and development it will be necessary to analyse the social and economic position of different groups of population and also examine carefully the institutional environment that produces the specific pattern of income distribution and influences the nature of changes over time.

An important new direction of enquiry is represented by recent contributions in the literature which rightly point out that the most important problem facing the developing countries of the world is that of mass poverty. A large proportion of the population in both rural and urban areas of these countries live below the poverty level, defined as the value of a consumption basket per capita which satisfies certain nutritional norms, e.g., minimum number of calories and the minimum amount of protein required for an average person [3;5;6;7;-11;20;21;25]. There is need to adopt measures for reducing the extent of mass poverty. To begin with, it will be necessary to estimate the extent of mass poverty and this raises many interesting issues. Like measures of income inequality, the central issue here is to obtain a measure of poverty on the basis of which meaningful welfare comparisons can be made.

The new shift of emphasis to the measurement of the dimension and trend of poverty level can be justified if one accepts the proposition that the performance of an economy, particularly that of a developing

economy, should be judged by the changes in the general poverty level of the country. Real income per capita or real consumption per capita and also the standard measures of inequality, although useful in many respects as indicators of development, do not reveal clearly the magnitude of poverty prevailing in the country, neither do they provide an adequate picture of changes in social welfare over time.

A crucial element in the above approach is the determination of "poverty line". This involves the determination of the minimum consumption requirement, a task compounded by a number of complex and interrelated problems. These problems are related to, (a) finding an acceptable criterion for the choice of minimum consumption basket, (b) choice of the representative item within each consumable group, and (c) choice of appropriate prices to value the minimum consumption bundle.¹

The second important element (once the poverty line is identified) in the analysis of poverty is the derivation of a poverty index. The measures used so far has been criticized for being insensitive to either the distribution below the poverty line (e.g., the head-count measure), or the number of persons below the poverty line (e.g., the poverty gap measure). It is rightly suggested by Sen [31;32] that in order to provide a basis for welfare comparisons, a poverty index should incorporate the following (a) number of people below the poverty line, (b) the income gap of the poor from the poverty line (greater weights to be attached to larger gaps) and (c) distribution of income below the poverty line. In a composite measure of poverty which we shall discuss later, Sen [31;32] incorporated the above elements.

It follows then that analysis of income distribution must be integrated into an analysis of mass poverty in developing countries. Any measure of income equality or inequality should reflect, to the extent possible, the general level of living of the different sections of the population. On the other hand, measures of poverty, in order to be meaningful, should incorporate measures of income distribution or changes in it. While Sen provides an answer to the latter, there still remains the need for a more generalized approach to the analysis of inequality. One simple way to achieve this is to combine a generally acceptable index of overall income inequality with the poverty index proposed by Sen. More on this combined index will be said later in the paper. However, the above do not exhaust all types of inequality in

¹ For further discussion see, [3, pp. 782-83].

a society neither does the combined measure indicated above represent the last word on deriving a basis for intertemporal and spatial comparisons of relative welfare.

A different dimension of inequality, which has not so far been discussed seriously in the literature, is considered here. This is inequality in the quality of life of the different sections of the population as reflected in the physical environment for each group which is influenced to a large extent by the policy of the government with respect to the distribution of public sector expenditure. Conventional measures of income (particularly in the national income accounts) do not include the transfer to individuals effected through the provision of public good (e.g., health, education, housing, recreational facilities and various types of infrastructure).¹ Therefore, indices of inequality and poverty probably understate intertemporal and spatial differences. Now, admittedly there are problems in obtaining measures of service flow from public goods enjoyed by each individual. At this level the problem of measurement is perhaps more intractable than at a more aggregate level. It is possible to provide a general measure of public services per economic unit available in different regions (e.g., rural and urban) or to different social groups (e.g., white collar workers, blue collar workers, peasants etc.). However, it will be necessary to make the simplistic assumption that within each group considered, all individuals have equal access to public good. It is thus, necessary that analysis of income inequality and poverty also takes note of the variation in the quality of life of the different social groups not entirely reflected in the conventional measures of real income.

What is really involved in the above is to devise a "quality of life index" (or simply called "quality index") which will be conceptually meaningful and empirically implementable. For being useful it has to be integrated into the combined "income inequality—poverty index" (IIP index) suggested above. Therefore, between two regions a similarity on the basis of the IIP index may be negated by the quality index. We shall call this final index as the "gross inequality index" (GI index).

The quality index will be a synthetic index in the sense that it will combine within itself a number of separate indices reflecting different types of transfer considered above. Two problems will immediately arise. First, since it will be almost impossible to obtain measures of

¹ Inclusion of these transfers gives what is called post-redistribution income which would give a measure of standard of living.

all items affecting, quality of life, a smaller set containing more important items will have to be picked. Second, what will be the weights attached to different items? Clearly this will involve some value judgement. In point of fact, one may argue that incorporation of quality index into measurement of inequality in certain situations may involve value judgements that may not be entirely acceptable to the target groups. At the present state of our knowledge, we shall have to limit ourselves to only a few items (possibly one or two), assign equal weights to each and obtain a quality index normalized in percentage units so that it may be compatible with standard inequality and poverty indices.

It is necessary to make a few observations on the concept of income to be used in measuring income distribution in developing countries [4;8;22;34]. The concept should correspond to personal disposable (after tax) income where income is broadly defined to include net factor income plus all current direct and indirect transfers received regularly. Transfer as defined here would also include those effected through "government 'exhaustive' expenditure" [34, p. 20]. In empirical literature, however, the latter is usually left out (we have suggested a different treatment above). Data on personal income distribution are mostly obtained from household income and expenditure surveys. The manner in which data are sometimes presented in the survey reports, particularly those of the developing countries, give rise to confusion as to which items should or should not be included in the definition of income in order to measure income inequality. Available data, therefore, needs to be carefully examined before one proceeds with the measurement of inequality and poverty. The following points are worth taking note of.

(1) The major confusion seems to be whether borrowings, drawing down of past savings and sale of assets should be included in income or not. Strictly speaking these items represent increase in liability and dissaving on the part of households and as such do not constitute a part of income. Besides to the extent measurement of income inequality is designed to reflect inequality in normal standard of living, the above items should be excluded from the definition of income.

(2) Treatment of capital gains (realised or not) present serious problem. Data limitation do not allow inclusion of this item in developing countries. Since the upper income groups tend to benefit more from this, the concept of income which does not include capital gains (specially the realised portion) tends to understate inequality.

(3) Salary income should include basic salary plus all types of

direct and indirect benefits received regularly out of employment (e.g., contribution of employer to the provident fund, subsidized meals, bonus etc.).

(4) There seems to be three views on the treatment of transfer items. Household income and expenditure surveys, in general, include them in the income concept [12]. A study on rural saving in India by National Council for Applied Economic Research (NCAER) excluded all transfer items from income stream [22, pp.68-71]. Bergan [8, p. 56] maintains that remittances received regularly should be included in the income concept and other transfer items should be excluded. This approach suggests itself as quite reasonable for measuring income distribution. In this respect the procedure adopted by NCAER in a recent income survey, in treating receipts from lotteries etc. as capital transfers appear a significant modification of its earlier stand [23, p. 3.7].

(5) For rural areas data on income do not include imputed value of family labour engaged in the construction of non-tradeable physical assets. One notable exception is rural saving survey by NCAER referred to above. In both micro and macro studies, the omission of this item has resulted in a systematic under-enumeration of income. Rural income inequality is probably slightly exaggerated because of this omission.

III. MEASURES OF INEQUALITY AND POVERTY

Income Inequality

A large number of measures of inequality has been in use in the literature on income distribution.¹ One way of looking at them is to consider them as statistical indices designed to provide a summary measure of the degree of income inequality in some given sense. In this respect the use of the different measures is limited to describing a given situation and changes in it over time or to comparing two situations at any point of time.

Even as descriptive measures of inequality, most of the standard statistical inequality indices suffer from certain shortcomings. The simplest measure range, considers only the extreme values while ignoring the whole array of distribution in between. The inadequacies of other measures of inequality can be summarised as follows : (i) dependence on

¹ For useful summary discussion see [34, pp. 137-53].

the mean income level (e.g., the variance, the relative mean deviation), (ii) overstate the importance of incomes at the lower range of distribution (the standard deviation of logarithms), (iii) the point of reference i.e., the concept of perfect equality is ambiguous (e.g., different measures of skewness — Bowley's index, Pearson's coefficient, cubed deviations), and (iv) the use of the measures depends on other statistical criteria which may not be satisfied (e.g., measures derived from 'laws' of income distribution — the Gini coefficient, the Pareto coefficient, the Lydall coefficient etc.).

From a different point of view, it is desirable to apply a normative test in terms of social welfare to different measures of inequality. To quote Sen, one would like to know, "what underlying view of social welfare or planning objectives, do they respectively imply" [31,p.1458]? As already pointed out, the set of welfare functions corresponding to different measures of inequality is highly restrictive. On the other hand, many of the measures are insensitive to transfers of income from a poorer to a richer person (e.g., relative mean deviation, index of decile inequality—within each decile). Some of the other measures are sensitive to transfer of income from a poorer to a richer person, but problem arises because either equal weights are attached to income transfers from all levels (e.g., variance, coefficient of variation) or the measures concerned suffer from the weakness mentioned above (e.g., standard deviation of logarithm).

The Gini concentration ratio calculated from the Lorenz curve is the most widely used measure of inequality. The measure is sensitive to income transfers and for transfers at middle income groups it assigns greater weight. The main problem still remains with the restrictive nature of the welfare functions implied by the Gini coefficient.

Sen [31,pp.1459-61] followed an axiomatic framework and proved a theorem that a welfare function $W(.)$ satisfying certain axioms that appear quite reasonable, must rank all alternative distributions in the same way as the negative of the Gini coefficient (G). In other words, minimising G is equivalent to maximising W . What Sen's effort does is to restore our confidence in the desirability of continued use of G for rank ordering the different distribution of income.

Poverty

The standard measure of poverty is head-count ratio or H which is expressed either as the number or the proportion of people below the poverty line. In a country with a large population base even a small

proportion may imply a large number in absolute term and the problem of removing poverty may be a real one.

Bressler [9,pp.65-71] suggested a measure of relative poverty in which different weights are assigned to poverty at different levels. If poverty is measured from the median income level, then according to him the relative measure of poverty would be given by

$$I = \int_0^t F(t \text{ median}) dt$$

$$\text{where, } F(t \text{ median}) = \int_0^{t \text{ median}} f(X) dX,$$

X = family income,

and $0 \leq t \leq 1$.

Unlike H , I is not insensitive to income transfers but it ignores distribution below the poverty line.

Another measure, the "poverty gap" which measures the total income gap of the poor from the poverty line ignores the number of people below the poverty line. By incorporating G the IIP index makes possible, this measure into a per-person percentage gap Sen [32] derives what he prefers to call "income-gap ratio" (I).

$$I = \sum_{i \in S(z)} g_i / qz$$

where, $g_i = z - y_i$,

z = poverty line,

y_i = income of i th individual,

q = number of people below poverty line,

and $S(z)$ = set of the poor.

This measure again is not sensitive to income transfers neither does

it assign different weights to different levels of poverty and also, of course, it ignores distribution below the poverty line.

Finally, the composite poverty index developed by Sen [31; 32] where he combines, H , I and G_p (Gini coefficient for the poor) is given by

$$P = H [I + (1 - I) G_p],$$

which lies between 0 and 1. P does not suffer from the shortcomings mentioned in the case of H and I . Moreover, P satisfies a number of axioms which are quite acceptable.

A New Measure of Inequality

In Section II we proposed a new measure which we called the IIP index. This index integrates the measure of overall income inequality G with the poverty index P . The IIP index is derived by taking arithmetic mean of G and P .

$$IIP = \frac{1}{2} (G + P) = \frac{1}{2} [G + H [I + (1 - I) G_p]].$$

The motivation behind proposing the above index is the following. While Sen's measure P provides a useful basis for comparing two situations, it is a partial measure in the sense that it does not reflect well being of the entire population as it is concerned only with the people below the poverty line. By incorporating G the IIP index makes possible to a limited extent though (limited because the "quality index" Q is not yet incorporated), intertemporal and spatial comparisons of social welfare. If the concept of relative deprivation as viewed by the poor groups in the society is to be built into an index of social welfare, then the position of the poor people should be evaluated not only in relation to a rather arbitrarily defined poverty line but also in relation to the overall mean income and also the incomes enjoyed by the upper strata of the society.¹ In this context it may be worthwhile to compare two situations with the same P . The first is one in which there is considerable concentration of people just above the poverty line with relatively fewer people at very high income levels commanding a considerable proportion of total income. The second situation on the other hand is characterized by a more even distribution of popula-

¹ Sen [30] points out that his poverty measure will become relative if it is made to depend, among others, " . . . on the ratio of the mean income of the poor to the mean income of the entire community".

tion above the poverty line and in particular, only a small proportion of the population being placed above but very close to the poverty line. One can now argue that the first situation is worse than the second, if not for anything else, simply because a slight change in the poverty line or in the condition of income generating activities of the society will pull down a substantial number of people below the poverty line. Such vulnerability to slight aberration in socio-economic and physical environment should be reflected in any index of social welfare. *G* may provide such information.¹ Other things remaining the same, a society with high degree of inequality of income and also a low level of overall mean income is likely to reveal such characteristic as a delicate balance around the poverty line. To push this point further, it can be said that in certain situations like those prevailing in very poor countries (e.g., Bangladesh), a reduction in inequality even though it may imply an increase in the poverty measure *P* will perhaps give a fighting chance for survival to a larger number (in absolute terms) of people than what is indicated by the present situation.

The desirability of incorporating an overall index of inequality in a composite index of social welfare as proposed above can not, therefore, be exaggerated. Both inequality and poverty, represent important dimensions of the state of affairs in the society such that they need to be simultaneously taken note of in making intertemporal and spatial comparisons of social welfare. At the present state of our knowledge about the structure of society of developing countries for which the above exercises have greater relevance, it seems that these two components should receive equal weights (although policy makers may think differently) in the composite index. Since both *G* and *P* are normalized in percentage units it will be convenient if equal percentage changes in them are assigned equal weights. This is what is achieved by taking arithmetic mean of the two components.

Some of the properties of IIP index may be pointed out. It can take values between 0 and 1. A higher value of IIP is associated with a higher degree of inequality and a lower level of social welfare. It may be recalled though that the IIP is not an index of inequality in the sense *G* is. It is an index of social welfare reflecting the degree of inequality in its strict sense and also the degree of poverty. It provides a basis for complete ordering. However, because of subsistence requirement *P* will never take on the value 1 [32] and therefore, IIP will

¹ It may be worth noting here again that for transfers at middle income group *G* assigns greater weight.

not also be unity. More importantly IIP will satisfy all the essential axioms which are satisfied by G and P [31; 32]. IIP does not satisfy the normalization axiom used by Sen to derive P. For our purpose, however, this is not essential. Some of the other axioms need to be slightly restated (mostly to read 'IIP measure' in place of 'poverty measure') while checking with IIP.¹ It may be pointed out here that the expression used for IIP that is the arithmetic mean, has certain merits over other possibilities, e.g., the geometric mean.²

Following Sen [32], in his analysis of the properties of P, the following points may be noted. If all poor have the same income, then as I approached unity IIP will approach the arithmetic mean of G and H. On the other hand, if all individuals in the society had the same income IIP will be given either by zero or one half of I depending on the relationship between the mean income of the community and the poverty level income.

Finally, we augment the IIP index by Q to account for differences in the quality of life between regions and social groups, as mentioned above. The quality index Q will be given by

$$Q = \sum_i \lambda_i Q_i$$

where Q_i = quality index associated with transfer item i ,

and λ_i = weight attached to Q_i .

As before, the augmented IIP index which we shall call "gross inequality

¹ We have provided only some intuitive justification of our measure IIP index and established sufficiency part of it with respect to a number of axioms. The task of identifying a set of axioms necessary to drive IIP index remains to be accomplished. Clearly, more work along this line is indicated for the future.

² In an earlier version of the paper we used the geometric mean approach. The problem with this is that it is inappropriate when either P or G takes on value zero because in such a case two situations will be ranked equally while they may have different levels of the other component (P or G), thus violating the monotonicity and the transfer axioms. To the extent one can assert that zero value of P or G is unlikely to occur in situations which we are mostly concerned with, one can perhaps continue to use geometric mean for rank ordering of social welfare. Besides, the question as to which of the two alternatives (within a limited range of values) is admissible under a more general set of axioms, remains to be answered.

index" (GI index), is derived by taking the arithmetic mean of (I - Q) and the IIP index. Thus

$$GI = \frac{1}{2} [(I - Q) + IIP] .$$

A higher value of GI will represent a lower level of social welfare. GI can take values between 0 and 1. We shall now discuss some results from Bangladesh on the basis of different inequality and poverty indices discussed above.

Empirical Results

Data on personal income distribution by size were obtained from a number of sources. Quarterly surveys of the Central Statistical Office of Pakistan provided data on both income and consumption expenditure for total, rural and urban Bangladesh during 1963/64, 1966/67 and 1968/69.¹ This set of data were used to calculate, G, P, IIP and GI indices following the procedure described above. On rural Bangladesh more recent data were available from a number of field surveys carried out by the Bangladesh Institute of Development Studies (BIDS). The first of these surveys covered fifteen villages all over Bangladesh and the reference period was July-October 1973. Data were collected on the income originating from rice production which accounts for a significant proportion of income of farm households in rural areas. The survey was however, limited to areas where High Yielding Variety technology has been adopted. It is assumed that the revealed pattern of income distribution is somewhat representative of the overall pattern prevailing in the rural areas of Bangladesh during the period under consideration. Only G was calculated on the basis of this set of data since it was inadequate to calculate other indices mentioned above.

The second survey was conducted in two selected areas (Phulpur and Thakurgaon) of rural Bangladesh and as such the data cannot be said to be representative of the country as a whole. However, very comprehensive information were collected on income and, therefore, it was possible to calculate G for total, agricultural and non-agricultural income separately for both areas. Other indices of inequality and poverty were also calculated from this set of data. The period covered was 1973/74. Finally, a somewhat more representative sample survey was undertaken in late 1974 covering about eight villages in different

¹ For more on the use of this set of data for measuring income distribution in Bangladesh, see Alamgir [3].

parts of rural Bangladesh.¹ The reference period was also 1973/74. Data on income were quite comprehensive and all indices of inequality and poverty could be calculated.

While calculating G and G_p linear approximations of successive segments of the Lorenz curve were taken. In order to obtain H , the poverty line had to be determined. This was based on a minimum consumption basket satisfying the requirement of 2100 calories and 45 gram protein. Value of this bundle was obtained by applying different sets of prices for rural and urban areas.² For years 1963/64, 1966/67 and 1968/69 calculations were made using constant prices of 1966 while for later years current prices were used. Calculation of I , P and IIP is rather straightforward and does not require any explanation.³ The quality index Q , because of lack of data, has been based on only one element that is the proportion of primary age group population attending school. This is thus only an indicative synthetic index which hopefully reflects the relative quality of life in different regions. The basic data on the schoolgoing population were derived from [13;14]. These two sources provided figures for 1960/61 and 1973/74. For other years the index was derived by interpolation.⁴ As more data will be available on other dimensions of quality of life, it will be possible to revise the present estimates of Q . Once Q is determined calculation of GI involves only one more step. Alternative indices of inequality and poverty for Bangladesh are shown in Table I. On the basis of figures presented the following general observations can be made keeping in view, of course, that a number of crude approximations were applied in the underlying calculations.

Both G and IIP ranks urban areas lower than rural areas while this is reversed by GI . Although G and IIP indicate the same ranking, yet the difference between rural and urban areas is more pronounced in

¹ Results shown here are based on data from five villages only.

² Determination of the poverty line is discussed more extensively in Alamgir [3, pp. 782-873 and 815-16].

³ It may be pointed out that in calculating I , the difference between group mean consumption/income and poverty level consumption/income instead of the difference for individual households was used because the latter was not mostly available. Consumption data were used for 1963-69 and income data for other period.

⁴ While estimating Q it was assumed that on an average 100 students attend a primary school.

G than in IIP. Clearly, the influence of the poverty index P is responsible for this difference. This result is also consistent with what is reflected in the rural-urban difference in real income per capita [3,pp.740-60].

Sen's contention that H is an inadequate index of poverty appears to be quite substantive. In both 1963/64 and 1966/67 rank ordering between rural and urban areas on the basis of H is reversed by P while in 1968/69 the latter indicates a more moderate difference between the two areas although the ranking remains unchanged. It is clear that both G_p and I play an important role in determining the index of welfare derived from poverty level. The influence of these factors particularly that of G_p is expressed more pronouncedly in 1966/67 than in other years. A significantly superior position of rural Bangladesh on the basis of H is entirely reversed by P. In other years while the difference between rural and urban areas in G_p is not very significant, it is the difference in I that either reverses (e.g., 1963/64) or confirms the ranking by H (e.g., 1968/69).

TABLE I
ALTERNATIVE INEQUALITY AND POVERTY INDICES FOR
BANGLADESH

Year	Area	C	G_p	H	I	$H \left[\frac{P}{I + (1-I) G_p} \right]$	$\frac{IIP}{1/2 (G+P)}$	Q	$\frac{GI}{1/2 [(1-Q) + IIP]}$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1963/64	Rural	0.33	0.26	0.88	0.18	0.35	0.34	0.20	0.57
	Urban	0.41	0.29	0.82	0.24	0.38	0.40	0.32	0.54
1966/67	Rural	0.31	0.40	0.62	0.14	0.30	0.31	0.26	0.53
	Urban	0.38	0.22	0.72	0.15	0.24	0.31	0.38	0.47
1968/69	Rural	0.27	0.17	0.79	0.14	0.22	0.25	0.30	0.48
	Urban	0.37	0.17	0.70	0.12	0.19	0.28	0.42	0.43
July-October 1973	Rural	0.48							
1973/74	Phulpur	0.28	0.24	0.85	0.28	0.38	0.34	0.21	0.57
	Thakur- gaon	0.34	0.27	0.76	0.29	0.37	0.36	0.45	0.46
1973/74	Rural	0.44	0.37	0.94	0.57	0.69	0.57	0.38	0.60

Source : See text.

If we ignore Q, then the limited social welfare index IIP, which takes account of population both below and above the poverty line, indicates a slightly higher level of welfare for rural areas as compared with urban areas in all years (except 1966/67 when there is no difference between the two). This seems quite reasonable since the lower strata of the urban poor is farther away from the poverty line than their rural counterpart and also the overall income distribution is much less unequal in rural areas as compared with urban areas. It is only when we incorporate Q in our index to obtain GI that we get results which are more appealing to commonsense. In other words, comparison on the basis of GI index turns out to be unfavourable for rural areas in all years. It would not be too much to claim that a carefully worked out GI index will provide a more reasonable basis for welfare ranking in inter-regional and international comparisons than either GNP per capita or rate of growth of GNP alone. In this context it may be reiterated that ranking on the basis of G and P alone is not adequate.¹

As for movement over time, all indices except H for rural areas show a similar trend over the period 1963-69 when an improvement in social welfare is indicated for both urban and rural areas of Bangladesh. However, limited evidence of the 1970's clearly reveal a considerable worsening of the situation no matter which index is used to make welfare comparisons. This is quite consistent with an earlier finding by Alamgir [3, pp.749-60] on the basis of trend in real wages of labourers in rural and urban areas of Bangladesh.

Keeping in view the limitations mentioned above, we now turn to make some international comparisons. Lack of data compel us to limit such comparisons to G and H alone and on H we have data for Bangladesh, Pakistan, Thailand and India only. Relevant data are presented in Tables II through IV below. It appears that the average level of income inequality in Bangladesh is less than other countries in Asia except the Republic of Korea. As for trend over time, available evidence indicate a reduction in inequality in Sri Lanka and Bangladesh while in the case of India the inequality seems to have increased. However, on the basis of expenditure data Minhas (Table III) has shown that inequality has declined in rural India between 1956/57 and 1967/68. Comparing the

¹ We should however be modest here and point out that for countries like Bangladesh which are at the lower end of the international spectrum with a large proportion of population below poverty line both P and IIP alone will be reasonable indicators of development (in the sense of reflecting changes in social welfare) for a considerable period of time in the future.

sectoral concentration ratios it is observed that Pakistan¹ comes out favourably (in terms of lesser degree of inequality) in both rural and urban areas. However, for all countries in the sample, the difference between the two sectors in the degree of income inequality appears to be similar.

Comparison of poverty ratios between Bangladesh, Pakistan, India and Thailand is quite revealing (Table IV). Unlike inequality index G, the poverty index H reveals a much inferior position of Bangladesh to that of India for comparable periods no matter which of the different estimates for India is accepted. In contrast Pakistan and Thailand come out favourably in comparison with both India and Bangladesh on the basis of H, a position also confirmed earlier for Pakistan in the case of G. This is true for both rural and urban areas. Whatever may be the revealed proportions, the most staggering phenomenon is that in all countries a large number of people in absolute terms are found to be living below the poverty level. As for trend over time, in the urban areas of Bangladesh though the absolute number increased the proportion of people below poverty line declined between early and mid 1960's happened inspite of the fact that income inequalities did not change appreciably over this period. In the case of rural areas, the proportion of people below poverty line declined between early and mid 1960's while there was a sharp increase during late 1960's and early 1970's. The latter trend is consistent with that of income inequality but the former is not. Therefore it is difficult to comment on the changes in social welfare without falling back upon the integrated indices suggested above. In contrast evidence from India present conflicting pictures as can be seen from Table IV. The opposing finding by Minhas and Bardhan regarding changes in H is explained by the use of different price indices to deflate current price figures. However, it may be pointed out that unlike Bangladesh, Minhas' finding on the trend in H is similar to that in G. Unfortunately, it was not possible to calculate composite inequality and poverty indices for India due to lack of data and, therefore, no definitive statement can be made about the changes in social welfare over time. Pakistan, on the other hand shows a systematic declining trend in both the poverty ratio H and the absolute magnitude of people below the poverty line. This trend is consistent in rural as well as urban areas of Pakistan during the 1960's. Lack of data again did not permit calculation of composite inequality and poverty indices.

¹ Ratios refer to consumption expenditure.

TABLE II
CONCENTRATION RATIOS OF INCOMES FOR
SELECTED COUNTRIES

Country	Year	Concentration Ratio
Bangladesh	1963/64	0.36
	1966/67	0.30
	1968/69	0.30
Sri Lanka	1953	0.50
	1963	0.49
	1969/70	0.34
India	1953/54	
	to	
	1956/57	0.34
	1961/62	0.35
Malaysia	1957/58	0.36
Philippines	1965	0.51
Republic of Korea	1966	0.26
Thailand	1962	0.50
Pakistan	1963/64	0.38

Sources : [3, p. 775 ; 8, p. 179].

TABLE III
SECTORAL CONCENTRATION RATIOS FOR
SELECTED COUNTRIES

Country	Year	Urban	Rural
Bangladesh	1963/64	0.41	0.33
	1966/67	0.38	0.31
	1968/69	0.37	0.27
India	1956/57		0.32
	1961/62		0.31
	1963/64		0.29
	1967/68		0.29
Philippines	1965	0.53	0.43
Sri Lanka	1952/53	0.52	0.45
Thailand	1962/63	0.45	0.44
	1968/69	0.44	0.33
Pakistan	1963/64	0.33	0.30
	1966/67	0.37	0.30
	1968/69	0.36	0.26
	1969/70	0.35	0.26

Sources : [3, p. 175; 18; 20, p. 98; 21, pp. 323 and 326].

TABLE IV

**POVERTY RATIOS AND NUMBER OF PERSONS
BELOW POVERTY LINE IN BANGLADESH,
INDIA, PAKISTAN AND THAILAND**

Country	Year	H		Number in Millions	
		Rural	Urban	Rural	Urban
Bangladesh	1963/64	0.88	0.82	49.89	3.24
	1966/67	0.62	0.72	37.92	3.84
	1968/69	0.79	0.70	50.70	4.35
	1973/74	0.94		63.96 ¹	
India					
1. Minhas	1956/57	0.65		215.00	
	1960/61	0.59		211.00	
	1964/65	0.52		202.00	
	1967/68	0.51		210.00	
2. Bardhan ²	1960/61	0.38		136.00	
	1964/65	0.45		175.00	
	1967/68	0.53		218.00	
3. Dandekar and Rath	1961/62	0.31	0.47	135.00	42.00
Pakistan ³					
	1963/64	0.43	0.55	16.70	6.78
	1966/67	0.32	0.47	13.30	6.81
	1968/69	0.25	0.35	10.90	5.59
	1969/70	0.26	0.25	11.50	4.25
Thailand	1962/63	0.47	0.03	11.00	0.15
	1968/69	0.26	0.02	8.20	0.15

Notes : 1) Estimated figure based on preliminary release of 1974 census and adjusted for an assumed 6 per cent undercount.

2) Population figures given in Minhas [20, p. 101] were used to estimate number of person below poverty line corresponding to the ratios estimated by Bardhan [5, p. 130].

3) Assumed poverty line is Rs. 250 in rural areas and Rs. 300 in urban areas both measured in constant 1959/60 prices. These figures appeared more reasonable than alternative ones (Rs. 300 and Rs. 375 respectively) suggested by Naseem [21].

Sources : a) Table I.

b) [3, p. 818; 5, p. 246; 11, p. 24; 20, p. 102; 21, pp. 322 and 325].

IV. SOME POLICY IMPLICATIONS

The major concern of planners in developing countries during the coming decade or two will be to tackle the dual problem of inequality and mass poverty while at the same time maintaining a reasonable rate of growth. The concept of growth, in this context, should be understood as one of increasing the availability of wage goods (those entering the minimum consumption bundle). However, just increasing the availability of wage goods is not enough. What is more important is to institute a mechanism by which people below the poverty line will obtain command (purchasing power) over these wage goods.

The degree of inequality observed in many developing countries is considerable, so that corrective measures need to be adopted to reduce inequality. To achieve this, two types of policy options can be considered. One is to identify the major sources of inequality in the society and adopt measures either to eliminate them or to neutralize their effect. The second would be to mop up surplus income from certain groups of population and redistribute it to others.

In formulating policies for action, the following steps may be considered. First, in order to assess the situation in a society at any point of time, the GI index should be calculated as accurately as possible. Second, given the fact that the relative magnitude of the different components of the GI index would indicate their relative importance, the policy maker should exercise his judgement in determining priorities in terms of tackling the different dimensions of inequality and poverty. Finally, indepth structural analysis of poverty and inequality should be carried out so that appropriate policies may be formulated.

Given the large magnitude of the number of people involved in countries like India, Pakistan and Bangladesh, clearly the primary objective of the policy makers should be to achieve a sustained reduction in mass poverty (however measured). Here the policy maker may decide to concentrate on the people near the poverty line, thus reducing the number below the poverty line and consequently reducing H, P and GI (assuming no change in other components). A conflict may arise here because of the opposing view that all efforts must be concentrated on groups of people at the bottom of the scale so as to narrow their income gap from the poverty line. More often than not, the tendency of the government is to look after the welfare of the marginal groups (measured from the poverty line) either because it is easier to do so or because it is

politically more convenient. For example, in some countries (e.g., Bangladesh), the government undertakes huge budgetary liability in terms of providing certain essential items of consumption at subsidized prices to some sections of the urban population who traditionally wield more political power than their relative number would justify, while the plight of a vast pool of the rural poor who are politically weak, go unnoticed except for occasional aid provided at the time of extreme distress (e.g., famine, natural calamities etc.). Similarly, it has been observed that the urban labourers are able to adjust their wages to price rise more easily than their rural counterpart [3,p.352].

Available data indicate that the most important source of inequality is the distribution of property (wealth) and the reason for continued existence of a large number of people below the poverty line is the complete lack of control or inadequate control over income generating assets, e.g., land in rural areas and different means of production (machinery, equipment etc.) in urban areas. In rural areas of Bangladesh it is found that inequality in rural income is largely explained by inequality in agricultural income¹ and this again can be related to inequality in landholding (ownership or operational). In general it is found that the distribution of landholding is much more unequal than the distribution of income. Between 1963/64 and 1967/68 the inequality in landholding reduced which is consistent with the trend in income inequality. However, after that the inequality increased and this is also consistent with the trend in income inequality and poverty.²

It is important to note that for a large proportion of rural households the average landholding is inadequate to provide them with the minimum subsistence. In addition, there are others who do not own any land at all and as such depend entirely on the sale of wage labour. Therefore, the number of rural households depending partially or totally on wage employment is considerable. Estimate for Bangladesh could be as high as 60 per cent of the total rural families.³ Because of this large pool of labourers seeking employment, the real wage rate has remained low. Estimates for Bangladesh reveal that in all years in the 1970's the real wage rates of the casual agricultural labourers have remained below the poverty line [3,p.785].

¹ This observation is based on 1973/74 survey data alone.

² These observations are based on data from Alamgir [3, p. 803] and BIDS surveys referred to above.

³ BIDS surveys.

Introduction of HYV technology in developing countries does not seem to have helped the situation in any significant way. As a matter of fact, diffusion of new technology in the rural areas is said to have a tendency to perpetuate or increase inequality, at least during the early transitional phase. In Bangladesh, the rural income inequality has increased during the period when adoption of HYV technology increased.¹ The increase in inequality appears very sharp when the Gini concentration ratio based on rice income in HYV areas is considered. Other things remaining the same the HYV technology, by way of increasing demand for hired labour will increase real wages but given the amount of surplus labourers in many developing countries, such an outcome may not be sustained for too long.² Besides, the high profitability of HYV create a tendency in large landholders to evict tenants and employ them as wage labour with consequent adverse effect on the labour market in terms of reducing the return to labour power. The undesirable effects of HYV technology originate primarily from the pattern of land ownership and also from the types of tenurial practices. The existing pattern of land ownership has serious implication for distribution of power and consequently distribution of control over other resources, e.g., credit, inputs, working capital, markets etc.

The analysis presented above do suggest a number of policies which could be actively considered as part of development strategy in the 1970's and 1980's for the developing countries. In the rural areas a drastic land reform is called for so that the existing ownership pattern and tenurial practices are effectively altered. This should be followed up by formation of production cooperatives in order to take advantage of the economies of scale implicit in agricultural transformation through introduction of new technology. This is extremely important because the low productivity of agriculture and other rural activities tend to perpetuate poverty in rural areas. Therefore, along with a better distribution of control over means of production steps must be taken to increase productivity. It is interes-

¹ However, limited evidence from Comilla Kotwali Thana indicates a reduction—though only marginal—in the inequality of income distribution of a sample of 122 farmers between 1963/64 and 1969/70 [1].

² In Bangladesh, there was a brief period between 1965-69 when a slightly increasing trend in real wage earning of the agricultural labourers could be discerned. Unfortunately, this was not enough to reverse the trend in mass poverty as can be seen from Table I and IV. In general, it can be stated that the HYV technology introduced in the 1960's did not have any appreciable impact on the real wages of agricultural labourers in Bangladesh. This finding is similar to the one observed by Bardhan for the Punjab and Haryana in India, see [3; 7].

ting to note that during 1973/74 in certain areas of Bangladesh the average size of farm that produced above poverty level income was above 5 acres. There is clear indication that the source of additional income must be increased, in productivity, if alternative sources of productive employment can not be generated. This obviously brings forth the need for emphasizing non-agricultural activities (e.g., small and cottage industry) so as to absorb a portion of the rural labour force. In this context quite often rural works programme and community development works are considered as sources of additional employment in rural areas. However, what is essential to note is that these activities must move away from their total dependence on foreign aid and be self sustaining and contribute directly or indirectly towards increasing the supply of wage goods. It is also necessary to ensure that the benefits accruing from these projects be equitably distributed. This concern is a real one in view of the fact that for much of these activities, pattern of benefit distribution tend to follow the pattern of property distribution which again calls for a redistribution of rural wealth, particularly land.

The observations made above are also closely related to the pattern of income distribution and mass poverty in urban areas of developing countries. Recently, conditions prevailing in rural areas have caused a significant drift of population towards urban areas particularly large metropolitan areas.¹ If alternative employment opportunities are not created in rural areas, this trend will continue with the result that real wages of urban labourers will be depressed and with the growth of squatters and shanty towns the quality of life in urban areas will considerably deteriorate. All of these will of course be reflected in the indices of inequality, and poverty mentioned above. One alternative policy measure would be to plan and provide for productive urban works programme. Here again, the prerequisites mentioned earlier for rural works programme will also apply. One can perhaps move a step further and suggest that in some of the developing countries there is perhaps need for deemphasizing urban growth and divert resources for rural and agricultural development. Urban growth should be entertained only to the extent justified by the level of development of the country, particularly of the industrial and other productive sectors. At present a large proportion of the urban economy in many countries is based on non-material producing sectors. Furthermore, it is interesting to note that some countries, e.g., Bangladesh, where in absolute term the level of urbanization is quite low are, relatively speaking, overurbanized [2,p.3].

¹ For some evidence on Bangladesh, see, Chaudhury [10].

Nothing much is known on the distribution of wealth in urban areas. Whatever limited data are available indicate a high degree of concentration [27;37]. However, given the class base of the political leadership in many developing countries and also given the political power—derived mostly from economic power—of the urban elite, it will be unrealistic to suggest radical redistributive policies. Nevertheless one must insist that certain amount of redistribution of wealth coupled with tax and transfer measures are unavoidable if the problem of inequality and poverty in urban areas is to be resolved upto a satisfactory level. Furthermore, a considerable degree of government and public sector participation in production and distribution activities is inevitable. It will be necessary to gradually limit the operation of private enterprise in sectors which tend to promote concentration of economic power. Furthermore, private ownership of urban property, e.g., real estate which give rise to speculative windfall gains) and rental income should be discouraged to a certain extent. These measures should be supplemented by a highly progressive tax structure and effective minimum wage legislation. In addition, the urban poor should be identified and their income be augmented by direct transfers from the government.

Therefore, in situations where direct redistribution of income and wealth can be carried out only to a limited extent, transfer of income in cash and kind from the government to various groups of population assumes great importance. This is why in developing countries quality incorporated welfare index makes more sense than other types of indices. However, there is need for careful planning of public sector investment in and administration of facilities through which transfers are to be effected. In many cases economically advantaged groups in the society are found to have greater access to public services either because of location or because of patronization which stem from economic and political power. These anomalies need to be corrected. One should add here that, in situations not involving ideological regimentation and social motivation, the above will not be realised so long as the seat of political and administrative) including allocation of resources) power is physically decentralized into smaller units operating all over the country although the need for a central coordinating machinery is not ruled out.

Last but not the least, is the need for an aggressive population control policy in developing countries like Bangladesh, India, Pakistan experiencing a very rapid rate of population growth. High population growth is usually reflected in large family size and higher dependency ratio. Dependency ratio by way of affecting total consumption level of the household, its saving and asset accumulation, affects income and its distribution.

With low rate of growth of productivity the above would also imply that gradually an increasing number of people will fall below the poverty line. Something along this line seem to have taken place in Bangladesh. In many cases large family size has led to liquidation of assets in the face of price inflation and thereby accelerating the process of pauperization particularly in the rural areas.

V. CONCLUDING REMARKS

The problem of measuring income inequality and then deriving policy implications is rather involved. In this paper we attempted to approach this problem at various levels. The conceptual and empirical issues involved in the measurement of income inequality were discussed. It was pointed out that levels of GNP/per capita income or their rates of growth as conventionally measured can not be used for comparisons of social welfare. In this respect the use of standard inequality measures is also limited and there are problems in deriving policy conclusions. In particular, the class of welfare functions corresponding to different measures of inequality is highly restrictive.

In view of the existence of mass poverty in many developing countries, the need for obtaining a comprehensive measure of poverty was stressed. Of the different measures of poverty, the one proposed by Sen was found to be quite reasonable. However, it was pointed out that in order to indicate the overall level of social welfare, one needed an index that would integrate measures of inequality, poverty and quality of life. Such an index was proposed and it was called gross inequality index.

Data from Bangladesh were used to calculate different indices of inequality and poverty discussed in this paper. It was found that the new measure GI index ranked rural and urban areas differently from other indices such as, G and I. During the 1960's all relevant indices show an improvement in social welfare while this trend seems to have been reversed in the 1970's. Since only few observations were available, conclusions on the basis of trend should be treated with caution. Bangladesh reveals a lower degree of inequality than a number of other developing countries except Pakistan. On the basis of poverty index H, Bangladesh compares very unfavourably with India, Pakistan and Thailand.

A number of interesting policy implications emerged from the analysis presented in this paper. In the rural areas land reform and

changes in tenurial practices are called for. These must be accompanied by formation of production cooperatives with special emphasis on agricultural transformation through the introduction of new technology. Land reform was also claimed to be necessary in order to neutralise the undesirable socio-economic impact of HYV technology. However, without provision of alternative sources of productive employment in non-agricultural activities in rural areas to a large number of labourers, the living condition of the majority of rural households (particularly those below the poverty line) can not be improved upon. In the urban areas emphasis would have to be placed upon containing the growth of private ownership of wealth (including means of production) and progressive tax and transfer measures. Within the existing power and class structure of the rural and urban society in many developing countries, it seems possible to effect transfers through public expenditure which will improve Q and also GI, that is levels of social welfare.

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Dynamics of Migration in a Rural Area of Bangladesh

by

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I. INTRODUCTION

There has always been considerable interest in studies of internal migration but recently it has drawn increasing attention from the developing countries and from international organisations [5, pp. 162-68]. Studies of internal migration are very important particularly in the context of a densely populated developing country like Bangladesh where spatial distribution of population should be of concern to the planners. The direction of internal migration for a country like Bangladesh is mainly from rural to urban areas.¹ The continuous influx of population from rural to urban areas may lead to unplanned growth of urbanization in the absence of growth of secondary sectors of economy (i.e., manufac-

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¹ Stoeckel using data from villages of Matlab Thana of Bangladesh found that at least two-thirds of the rural migrants move to urban areas [30].

turing, etc.). The urban population in Bangladesh constitutes only 8.78% of the total population [11] but its annual rate of growth (exponential) is higher than the corresponding rates of rural and total population since 1901 and this disparity in rate of growth between urban vs. total population and urban vs. rural population has been more pronounced since 1951 (Table I and Appendix A). Although this higher growth of urban population is due largely to the shift of population from rural to urban areas¹ yet we have very inadequate knowledge of the dynamics of rural-urban migration. Knowledge of the dynamics of rural-urban migration is necessary for planning settlement or rehabilitation programmes for migrants at the places of origin and also at the places of destination.

Unfortunately, there are only few studies on migration in Bangladesh which are again limited to the estimates of migration inferred from change in age-structure or total numbers in a locality between two census periods [20; 21; 25] or to estimates of international migration [18; 19]. However, a major exception to the above is the work of Stoeckel who, using the same data as the present study, tried to identify the characteristics of the out-migrants, the causes of out-migration and destination of the out-migrants [30]. Stoeckel's study was based on data for one year only and, therefore, no trend or pattern of the characteristics of the migrants could be identified. Moreover, it missed several important factors such as marital status, elaborate family structure in the analysis of the selectivity of the migrants; age in the analysis of the reasons of migration. Besides, the destinations of the out-migrants were not looked at beyond broad categorization of receiving places into urban and rural areas. Furthermore, the study was limited to the out-migrants only. To meet these limitations partly and to gain some new insights about the rural migrants of Bangladesh, the present study makes a modest attempt to examine the trend, pattern and variations in net-migration, the selectivity of the in and out-migrants, the reasons for in and out-migration, the destination of the out-migrants, the place of origin of the in-migrants and some push-pull factors for migration of both sexes for a period of five independent years (1968/69; 1969/70; 1970/71; 1971/72 and

¹ This assumption could be safely made when there is no significant differences in natural rate of increase (CNRI) between urban and rural areas [22]. According to 1974 Population Growth Survey (PGS) estimates, the CNRI for rural and urban areas are found to be 3.0 and 3.2 per 100, respectively [24].

According to one recent estimate, the immigrants as a per cent of total urban population in 1974 is estimated to be 39.36 [9].

1972/73) using data from 101 villages of Matlab Thana.¹ The selection of the villages of Matlab for the present study is entirely dictated by the availability of data.

II. DEFINITION, DATA AND METHODS

Definition

An out-migrant is defined in this study as one who has moved outside of the study area and has not returned in six months time. On the other hand, an in-migrant is defined as one who has moved into the study area and stayed there for six months. Although, the cutting points used here to delineate the out and in-migration status of a person may not help one to find permanent nature of movement (in or out), yet the above definitions will help one to eliminate the casual movers from our analysis.

The data on out/in-migration are obtained from a registration system which records all vital events (birth, death and migration) of 101 villages. The registration system runs as follows: each local female resident (field worker) of each village visits each household daily with a view to checking whether any person has left and/or arrived in the village (along with checking all births and deaths) and reports the same to a male Field Assistant (who supervises three to five field workers) who is responsible for keeping the data of departure and arrival of a person under observation. He visits each household on an average once a week and checks whether a person who is reported to have left the area has returned to the area in the meantime and also whether the person who has moved in the area still living there or not. In this process, if a person who has moved out of the area has not returned in the succeeding six months from the date of his or her departure, the event is recorded as out-migration. In case of a person who has arrived in the study area and has been staying there for the following six months from the date of his or her arrival, the event is treated as in-migration. The work of the Field Assistant is supervised by a Sanitary Inspector who visits each household twice a month. The work of the Sanitary Inspector is in turn supervised by the Field Surveillance Supervisor and his deputy. This chain of supervision was arranged to ensure reliability of data.

Methods

Migration rates are the main tools of analysis in this study. These rates can roughly be divided into two groups: group-A and group-B.

¹ Matlab is located in the south-central area of Bangladesh in the district of Comilla.

Group-A contains the yearly and age-sex specific rates. Group-B contains the rates by marital status, family structure, family size and occupation.

The rates for group-A are derived as follows :

$$(i) \frac{M_O}{P} K; (ii) \frac{M_i}{P} K; (iii) \frac{M_{OA}}{P_A} K \text{ and } \frac{M_{iA}}{P_A} K$$

where, M_O and M_i refer to total number of out and in-migrants of a given year; M_{OA} and M_{iA} refer to number of out and in-migrants of a specific age and sex-group of a given year; P and P_A refer to mid-year total population and mid-year population of a particular age-sex group of a given year, respectively and K is the constant which is 100 in this case.

The mid-year population is derived as follows :

$$P_O + \frac{B - D + I - O}{2}$$

where P_O refers to the population at the beginning of a year and B , D , I and O refer to birth, death, in-migration and out-migration, respectively during a given year.

The rates for group-B are derived as follows :

$$(i) \frac{M_{OA}}{P_A} K \quad (ii) \frac{M_{iA}}{P_A} K$$

where M_{OA} and M_{iA} refer to number of out and in-migrants of a particular socio-demographic category of a given year and P_A is the total population of the corresponding socio-demographic group enumerated at the beginning a year and K is the constant which is 100 in this case.

The difference in two sets of rates lies only in the use of base population. To compute the rates in group-A, we have used the mid-year population in the denominator, while for the rates in group-B, we have used the population at the beginning of a year in the denominator.

The reason for not using the mid-year population at the base for computing the rates in group-B is the lack of required data . However, it should be noted here that the use of either mid-year population or population at the beginning of a year at the base will yield about the similar result when the migration interval is short, say a single year or of less [29,pp.579-619]. Moreover, both mid-year population and population at the beginning of a year were widely used in calculating the rates of migration [29,pp.579-619;31,pp.356-66].

A further issue regarding the base population needs to be emphasized here. This is concerned with the choice of an area whose population should constitute the base for working out the migration rates. For out-migration from an area, the base population in question is clearly that of the place of origin itself. For in-migration, the logical base population is that of the balance of the country. For practical reason, this base is never used ; rather the rates of in-migration are calculated using population at the place of destination. In this study, we have used population of the study area as base to find out the rates of out and in-migration.

III. FINDINGS AND DISCUSSION

A. Yearly Rate of Migration

Table A. 1 presents data on yearly rates of out, in and net migration by sex for the years 1968/69 through 1972/73. Table A.1 shows the following patterns : First, more people of both sexes move out from the study area than move in (see the negative sign of net migration). This is found to be true for almost every year under study with the lone exception of 1970/71 when the study area received more people than it sent out. In-migration rates by male and female reached its peak in the year 1970/71. On the other hand, out-migration rate reached its lowest level in 1970/71. This exceptional rise in-migration and dip in out-migration rate in the year 1970/71, may be due to the effect of the war of liberation.

Second, in-migration rate for females is at least 1.02 time higher than for males. This is found to be true for each and every year under study. The higher in-migration rate for females in comparison to males may be due to the fact that while males usually move out in search of occupational opportunities, the females move out mainly as dependents, including those who move because of marriage (Table C.1). Since occupational opportunities are less likely to occur in rural areas,

we will expect proportionately fewer males to move into the rural areas in comparison to females who will move there as bride and/or dependents. This suggests that the male movement is more voluntary in nature than the female movement which is more involuntary in nature.

Third, two differential patterns are noticed in the out and net migration rates by sex. Net migration rates for males were at least 2.25 time higher than for females during the first two years (1968/69 and 1969/70) but this trend is reversed in the later years of the study periods i.e., (1971/72 and 1972/73) when the females out-stripped the males in the out and net migration rates. However, the difference between sexes in the net and out-migration rates for the years 1971/72 and 1972/73 are not as high as were found for the years 1968/69 and 1969/70. The relatively higher out-migration rate for female in 1971/72 and 1972/73 was due to increasing female out-migration primarily in the age-group 10-14, followed by those females who are in the age-group 15-19. Female to male ratio of out-migration rate in the age-group 10-14 rose from 1.21 : 1.00 in 1968/69 to 1.85 : 1.00 in 1972/73 and the corresponding ratio for the age-group 15-19 rose from 1.04 : 1.00 in 1968/69 to 1.41 : 1.00 in 1972/73 (Table B.1). If the female to male ratio of out-migration in the age groups 10-14 and 15-19 in 1971/72 and 1972/73 were the same as in 1968/69, the overall out-migration rates for males in 1971/72 and 1972/73 would have been higher than the corresponding rates for females.

The higher female out-migration, particularly in the age-groups 10-14 and 15-19 in the years 1971/72 and 1972/73 possibly arose out of the following facts : during the war of liberation we have noticed a rise in the in-migration rate of young girls in the age-group 5-9, which showed an increase of 53.8% from its level of 1968/69 (Table B.2). Many of these girls would have reached the ages of 10 and 11 by 1971/72 and 1972/73 and they were possibly returning to their places of origin along with the fresh recruits of females in the age-group 10-14 and this may have inflated the female out-migration in the age-group 10-14 in 1971/72 and 1972/73. Second, out-migration rate by ever-married females has increased by 61.42% between 1968/69 and 1972/73 (Table B.4). This hike in the out-migration rate for the ever-married females may also have caused the higher female out-migration in the age-groups 10-14 and 15-19 because a major proportion of girls in Bangladesh are married within the age-range 10-19.¹

¹ According to 1961 Census, 61.77% of the females in the age-group 10-19 were found to be ever-married [13].

TABLE A.1

RATE OF OUT-MIGRATION, IN-MIGRATION AND NET MIGRATION (PER 100 POPULATION) OF
101 VILLAGES OF MATLAB THANA BY SEX FOR SPECIFIC YEARS, 1968/69, 1969/70,
1970/71, 1971/72 AND 1972/73

	1968/69			1969/70			1970/71			1971/72			1972/73		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Out-migration	4.36	3.17	3.77	3.24	3.17	3.21	2.09	2.86	2.47	2.44	2.73	2.59	3.32	3.63	3.48
Number	2441	1720	4161	1852	1768	3620	1233	1639	2872	1489	1605	3094	2065	2186	4251
In-migration	2.61	2.67	2.64	2.61	2.90	2.75	3.07	3.13	3.10	2.38	2.54	2.46	2.44	2.64	2.54
Number	1464	1448	2912	1491	1613	3104	1811	1798	3609	1453	1495	2948	1517	1582	3099
Net-migration	-1.74	-.50	-1.13	-.63	-.23	-.45	.98	.27	.63	-.06	-.18	-.12	-.88	-1.00	-.94
Number	-977	-272	-1249	-361	-155	-516	578	159	737	-36	-110	-146	-548	-604	1152
Base Population	56010	54217	110227	57132	55607	112739	53983	57248	116231	60879	58304	119683	62096	59905	122001

B. Selectivity of Migrants

B. 1. Out-migration by Age and Sex

Table B.1 presents data on out-migration by age and sex for the different years under study. Table B.1 shows that young adult males in the age-range of 15-29 are disproportionately selected for out-migration with the maximum concentration in the age-group 20-24, followed by the age-group 15-19. Female out-migrants are largely concentrated in the early young adult-ages i.e., in the age-range of 10-19, with maximum clustering in the age-group 15-19, followed by the age-group 10-14. The overall relationship between age and out-migration may be summed up as follows: rates of out-migration are low before adulthood, rise sharply to a peak in the early adulthood and then taper off with increasing age. This pattern is true for both sexes. The finding of disproportionate selection of the out-migrants in the young adult ages is found to be true universally [6, pp. 486-509; 32, pp. 313-35; 33]. Various reasons could be adduced to explain this larger concentration of migrants in the young adult ages. The common explanations are, youths, find it much easier to move out, they are more prepared to undertake risks and uncertainties and for them it is easier to adjust to a new situation in comparison with the older people. As for female out-migrants in the age-groups 10-14 and 15-19, the reason is marriage which for the girls in Bangladesh largely takes place within the above age-range.¹ This is also supported by data presented in Tables C.2 and C.4

It can be further observed from Table B.1 that the out-migration rates for male exceeds the female rates in most age-groups, the only exceptions being the age-groups 10-14 and 15-19. The finding of higher out-migration rate for male in comparison to female is also supported in the other studies [6, pp. 486-509; 7, p. 765; 27, pp. 167-285; 28, pp. 241-305]. This differential out-migration by sex may be due to the following facts: Out-migration to a new place involves certain

¹ According to 1961 Census, 60.23% of the girls in the age-group 10-19 were found to be currently married [13] and the median age at marriage for Bangalee girls is found to be 14.0 [3, pp. 489-99].

TABLE B.1
RATE OF OUT-MIGRATION (PER 100 POPULATION) FROM 101 VILLAGES OF MATLAB
THANA BY AGE AND SEX FOR SPECIFIC YEARS, 1968/69, 1969/70, 1970/71,
1971/72 AND 1972/73

Age	1968/69		1969/70		1970/71		1971/72		1972/73	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0—4	2.73 (270)	2.52 (243)	2.32 (232)	2.38 (230)	2.50 (253)	2.38 (232)	2.06 (212)	2.16 (213)	2.23 (223)	2.44 (244)
5—9	1.98 (200)	2.03 (200)	1.85 (185)	1.75 (171)	1.71 (170)	1.86 (180)	1.63 (161)	1.77 (169)	2.57 (248)	2.53 (234)
10—14	4.66 (363)	5.64 (375)	3.97 (290)	5.99 (426)	2.18 (185)	7.39 (547)	2.36 (207)	4.16 (318)	3.61 (323)	6.76 (528)
15—19	8.92 (401)	9.31 (390)	7.16 (352)	10.08 (475)	3.41 (188)	5.15 (273)	3.20 (195)	6.71 (390)	5.75 (373)	8.12 (503)
20—24	10.91 (297)	4.65 (180)	7.17 (213)	3.89 (152)	3.20 (114)	3.24 (132)	3.75 (143)	3.93 (170)	6.39 (270)	6.26 (285)
25—29	8.02 (248)	2.94 (123)	6.48 (193)	2.71 (111)	2.78 (84)	2.22 (90)	5.09 (159)	2.95 (120)	5.39 (176)	3.41 (139)
30—34	7.05 (221)	1.73 (56)	3.59 (110)	1.49 (51)	2.05 (63)	1.55 (55)	3.73 (116)	1.68 (61)	4.44 (138)	2.28 (84)
35—39	4.92 (162)	1.53 (44)	2.98 (96)	1.16 (34)	1.77 (57)	0.95 (29)	3.51 (112)	1.43 (45)	3.34 (105)	1.81 (58)
40—44	3.82 (95)	1.59 (34)	2.34 (61)	1.06 (24)	0.99 (27)	1.04 (25)	1.88 (53)	1.11 (28)	2.76 (79)	1.10 (29)
45—49	3.08 (72)	1.16 (23)	1.66 (30)	1.30 (26)	1.46 (35)	0.64 (13)	1.97 (48)	1.19 (25)	1.81 (45)	0.92 (20)
50+	1.68 (113)	1.09 (51)	1.16 (81)	1.16 (68)	0.79 (45)	1.04 (63)	1.11 (83)	1.06 (66)	0.98 (75)	0.96 (62)
All Ages	4.36 (2442)	3.17 (1719)	3.24 (1852)	3.17 (1788)	2.09 (1233)	2.85 (1639)	2.44 (1489)	2.73 (1605)	3.32 (2065)	3.65 (2186)
Mid-year Population	56010	54217	57132	55607	58983	57248	60879	58804	62096	59905

Note : Figure in parenthesis refers to age-specific number of out-migrants.

amount of uncertainties and risks and culturally males in Bangladesh are more prepared to undertake such risks and uncertainties than females. Moreover, females particularly of the rural areas of Bangladesh do not usually move out in search of independent work unlike their male counterpart. Higher female out-migration in the age-groups 10-14 and 15-19 in comparison to male may be due to differential reasons of out-migration and their relationship to age and sex. A higher proportion of males move out for occupational opportunities while a higher proportion of females move out for marriage (Table C.1). But the exodus of females due to marriage is much higher than the exodus of males due to occupational opportunities in the age-group 10-14 and 15-19¹ and this may lead to higher out-migration rate for female than male in the above age-groups.

B. 2. In-migration by Age and Sex

Table B.2 presents data on in-migration by age and sex. Table B.2 shows that the male in-migrants are largely concentrated in the age-range 20-34 with the higher rate mostly falling in the age-group 25-29. The female in-migrants, on the other hand, are mainly selected in the age-group 15-19. The reason for relatively higher age for the male in-migrants may be that among the in-migrants there is a considerable proportion of reverse-migrants (Table C.3) i.e., those who have returned home. A significant proportion of these reverse migrants came back at higher ages² and this could also push up the age of the in-migrants. Concentration of female in-migrants in the age-group 15-19 may be attributed to the fact that marriage which is an important reason for the movement of females largely takes place, as already observed within the age-range 10-19. It can be further observed from Table B.2 that although the overall in-migration rate for female exceeds the male rates for each and every year under study, this overall pattern is not repeated for each and every age-group at least not found in ages above 20 where the male rates out-weighed the female rates. Age at marriage for females and also age-range of reverse migrants may explain this differential pattern of male and female in-migration by age. The selection of the male reverse migrants at higher ages may be due to the fact that these migrants possibly moved out of the study area relatively at an early adult age and they either worked or looked for work for a few years at their places of destination before they returned home at a later age.

^{1,2} These data are not presented in this paper but they are available with the authors.

TABLE B.2
RATE OF IN-MIGRATION (PER 100 POPULATION) FROM 101 VILLAGES OF MATLAB
THANA BY AGE AND SEX FOR SPECIFIC YEARS, 1968/69, 1969/70, 1970/71
1971/72 AND 1972/73

Age	1968/69		1969/70		1970/71		1971/72		1972/73	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0—4	1.86 (184)	1.96 (189)	2.30 (230)	2.24 (216)	2.96 (301)	2.80 (213)	1.29 (133)	1.18 (117)	1.86 (195)	3.33 (332)
5—9	1.41 (143)	1.71 (168)	1.67 (167)	1.71 (167)	1.97 (196)	2.63 (254)	2.22 (219)	2.16 (207)	1.43 (138)	1.34 (124)
10—14	2.60 (203)	3.12 (208)	2.53 (206)	3.84 (273)	2.68 (227)	3.68 (273)	1.94 (170)	2.43 (186)	1.95 (173)	3.53 (276)
15—19	4.04 (182)	10.55 (442)	3.73 (185)	10.64 (501)	3.58 (197)	9.19 (487)	2.86 (174)	6.59 (383)	2.59 (168)	9.44 (585)
20—24	5.80 (158)	4.29 (166)	4.95 (147)	3.81 (149)	5.12 (172)	3.71 (151)	3.83 (146)	5.11 (221)	4.90 (207)	3.36 (153)
25—29	6.46 (200)	2.43 (102)	5.61 (167)	2.37 (97)	6.67 (201)	3.06 (124)	4.74 (148)	3.57 (145)	6.74 (220)	2.06 (84)
30—34	3.60 (113)	1.60 (52)	3.39 (104)	1.84 (63)	5.14 (158)	1.91 (68)	4.86 (151)	1.54 (56)	4.15 (129)	1.36 (50)
35—39	2.85 (94)	1.15 (33)	3.32 (107)	1.12 (33)	3.70 (119)	1.85 (56)	3.10 (99)	1.62 (51)	3.60 (113)	0.93 (30)
40—44	2.33 (58)	0.89 (19)	2.07 (54)	1.36 (31)	2.57 (70)	1.17 (28)	2.09 (59)	1.43 (36)	2.10 (16)	0.61 (20)
45—49	2.18 (51)	0.65 (13)	2.01 (47)	0.85 (17)	2.51 (60)	0.93 (19)	2.05 (50)	1.00 (21)	1.81 (45)	0.92 (20)
50 +	1.16 (78)	1.19 (56)	1.16 (81)	1.12 (66)	1.52 (110)	1.83 (114)	1.39 (104)	1.15 (72)	0.90 (69)	0.93 (60)
All Ages	2.61 (1464)	2.67 (1448)	2.61 (1491)	2.90 (1613)	3.07 (1811)	3.13 (1797)	2.33 (1453)	2.54 (1495)	2.44 (1517)	2.64 (1582)
Mid-year Population	56010	54217	57132	55007	53033	57243	60379	58804	62096	39903

Note : Figure in parenthesis refers to age-specific number of in-migrants.

B. 3. Net-migration by Age and Sex

Table B.3 presents data on net-migration rates by age and sex. Table B.3 shows that the study area on the whole is experiencing a net exodus of its population in four out of five different years under observation. The net out-migration of population was not confined to a particular age or sex group, rather it was widely diffused among different age-groups and between sexes for a majority of the net loss years. The only departure from the above trend was found in the year 1970/71 when the study area showed a net gain of population in all the age-groups of males and all but the age-group 10-14 of females. The lone positive net migration rate of 1970/71 could be attributed to the Bangladesh war of liberation.

The finding of the only net exodus of female in the age-group 10-14 in the year 1970/71 may be due to the fact that a higher proportion of girls in this age-group moved out to other areas because of marriage.¹ In 1970/71, 72.57% of the girls of the above age-group moved out of the study area due to marriage which showed an increase of 12% from its level of 1968/69. This hike in marriage of the girls in the age-group 10-14 during the war of liberation may be attributed to an attempt on the part of the parents to protect their girls of marriageable age from perceived fear of harm from the occupation army.

It can be further seen from the Table B.3 that there is consistently a small but net gain of female population in the age-group 15-19 for four out of five different years under study. (The one insignificant exception being 1971/72 when there was a net loss of only seven females in the above age-group). In other words, more females in the age-group 15-19 moved in than moved out. This trend may be attributed to the following facts: (i) the female reverse-migrants i.e., who have returned home are disproportionately selected in the age-group 15-19; (ii) 4.5% to 7.8% of the female in-migrants who moved into the study area because of marriage are urban originated (Table C.11). The median age at marriage of the urban girls is found to be 16.0.² It means that the urban girls who moved into the study areas as brides are also likely to be selected in the age-group 15-19. The above factors may explain relatively higher female in-migration than out-migration in the age-group 15-19.

¹ Girls in the age-group 10-14 usually move out because of marriage (Table C.2).

² Estimated female mean age at marriage for urban and rural areas of Bangladesh is found to be 16.0 and 13.63, respectively. This estimate is derived from the census data of 1961 by using Hajnal's techniques [16].

TABLE B.3
RATE OF NET-MIGRATION (PER 100 POPULATION) FROM 101 VILLAGES OF MATLAB
THANA BY AGE AND SEX FOR SPECIFIC YEARS, 1968/69, 1969/70, 1970/71
1971/72 AND 1972/73

Age	1968/69		1969/70		1970/71		1971/72		1972/73	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0-4	-87 (-86)	-56 (-54)	-02 (-2)	-14 (-14)	47 (48)	42 (41)	-77 (-79)	-97 (-96)	-36 (-38)	-60 (-60)
5-9	-56 (-57)	-32 (-32)	-18 (-18)	-04 (-4)	26 (+26)	76 (+74)	58 (+58)	39 (+38)	-114 (-110)	-119 (-110)
10-14	-205 (-160)	-251 (-167)	-103 (-84)	-215 (-153)	+49 (+42)	-370 (-274)	-42 (-37)	-172 (-132)	-169 (-150)	-323 (-252)
15-19	-487 (-219)	124 (52)	-337 (-167)	55 (26)	+16 (+9)	403 (+214)	-34 (-21)	-12 (-7)	-316 (-205)	132 (82)
20-24	-511 (-139)	-36 (-14)	-222 (-66)	-07 (-3)	172 (+58)	46 (+19)	07 (+3)	118 (+51)	-149 (-63)	-290 (-132)
25-29	-155 (-48)	-50 (-21)	-87 (-26)	-34 (-14)	388 (+117)	83 (+34)	-35 (-11)	61 (+25)	135 (44)	-135 (-55)
30-34	-344 (-108)	-12 (-4)	-19 (-6)	35 (12)	309 (+95)	36 (+13)	112 (+35)	-13 (-5)	-29 (-9)	-93 (-34)
35-39	-206 (-68)	-38 (-11)	34 (11)	-03 (-1)	193 (+62)	89 (+27)	-40 (-13)	19 (+6)	25 (8)	-87 (-28)
40-44	-149 (-37)	-70 (-15)	-27 (-7)	31 (7)	158 (+43)	12 (+3)	21 (+6)	31 (+8)	-66 (-19)	-49 (-13)
45-49	-90 (-21)	-50 (-10)	34 (8)	-45 (-9)	104 (+25)	29 (+6)	08 (+2)	-19 (-4)		
50 +	-52 (-35)	010 (5)	-05 (-4)	-003 (-2)	073 (53)	001 (1)	028 (21)	-009 (-6)	-07 (-6)	-003 (-2)
All Ages	-174 (-978)	-50 (-271)	-63 (-361)	-28 (-155)	98 (578)	27 (158)	-06 (-36)	-18 (-110)	-88 (-548)	-100 (-604)
Mid-year Population	56010	54217	57132	55607	58983	57248	60879	58804	62096	59905

Note: Figure in parenthesis refers to age-specific number of net-migrants.

Marital Status; Family Size; Occupation and Family Structure

We will now present data on the selectivity of the out-migrants by marital status, family size occupation and family structure for the years 1968/69, 1969/70 and 1972/73. Here, some introductory remarks are necessary before data are presented on the above migration rates. Migration rates for each of the above socio-demographic characteristics are found simply by dividing the total migrants of a particular socio-demographic category by the corresponding base population and then multiplying by 100. However, information on the above socio-demographic characteristics for the base population was only available for the year 1968/69 when a complete census of the study area was taken. This raises an important problem of finding the migration rates by the above mentioned socio-demographic characteristics for the periods following 1968/69, when information on these selected characteristics for the base population is not known. One can, however, get the distribution of the base population by these socio-demographic characteristics for the periods following 1968/69, if one assumes that the distribution of base population by these characteristics for the periods following 1968/69 remained the same as that of 1968/69. This is what was followed here. This assumption of stability in the proportion distribution of the above socio-demographic characteristics would not be very unrealistic in view of the static or semi-static character of rural Bangladesh where no significant structural change is expected within such a short period of four years. However, 1970/71 and 1971/72 were excluded from the above analyses since these two years cover the war of liberation and the immediate post liberation period of Bangladesh when influence of exogenous forces as mentioned above may have resulted in a pattern of distribution of the selected socio-demographic characteristics somewhat different from that of 1968/69.

Marital Status ; Family Size and Family Type

Tables B.4 and B.5 present data on the selectivity of the out-migrants by marital status ; family size and family type, respectively. Table B.4 shows the following patterns of selectivity of the out-migrants : (i) single males are more prone to move out than the ever-married males, but in case of females, the propensity to move out is higher for the ever-married

females than the single women for a majority of the study periods. It would be further observed that the out-migration rate for ever-married females is progressively increasing from year to year. The out-migration rate for the ever-married females has increased by at least 61.42% from the level of 1968/69 to 1972/73; (ii) out-migration rate is higher in the smaller households declining gradually through sizes seven to nine members and then increasing in the largest sizes. However, a little departure from this trend is noticed in the year 1972/73 when out-migration rate is found to be positively associated with the household size for both sexes i.e., out-migration rate increases with the increase in the household size; and this rate goes at least as high as 6.00 in the highest household size for both sexes. Out-migration rate by family type shows the following patterns of relationships (Table B.5) : the single person family of both sexes consistently has the highest rate of out-migration ; followed by the families comprising of husband and wife only and the joint families of both sexes for a majority of the study periods. It is further interesting to observe that families comprising of young and older generations have lowest rate of out-migration.

The findings of higher out-migration rates among the single male, smaller household size, single person family and families comprising of husband and wife only may be due to the fact that these are the most mobile segment of the population; for them it is possibly much easier to move from one place to another, and the cost of movement may be also relatively lower for them. Higher propensity to move out among the ever-married females in comparison to the single women may be attributed to differential scope of physical mobility by marital status of the females. The single women have relatively less scope for independent physical mobility outside the village areas in comparison to ever-married girls in a traditional Muslim society like that of Bangladesh. The finding of higher out-migration rate by ever-married females in 1972/73 than its level of 1968/69 possibly implies that more ever-married female in 1972/73 in comparison to 1968/69 are moving out with their husbands or they are joining their husbands at their places of work leaving behind their village homes.

The higher out-migration rate in the largest household sizes may arise out of one of the following reasons : (i) size may itself act as a push factor for higher out-migration in the largest household sizes. For the largest household sizes, it may be difficult to support adequately (food and cloth) all its members, with the result the members would be encouraged to leave because of sub-standard support ; (ii) or it may

TABLE B.4
RATES OF OUT-MIGRATION (PER 100 POPULATION) FROM 101 VILLAGES OF
MATLAB THANA BY MARITAL STATUS AND FAMILY SIZE BY SEX,
1968/69, 1969/70 AND 1972/73

Variable	1968/69						1969/70						1972/73					
	Male		Female		Total		Male		Female		Total		Male		Female		Total	
	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N
MARITAL STATUS																		
Single	4.37	1511	3.40	895	3.95	2406	3.32	1178	2.07	566	2.77	1744	3.95	1538	2.66	790	3.39	2328
Ever Married	4.02	838	2.80	760	3.33	1593	2.33	499	3.84	1085	3.19	1584	1.84	434	4.52	1324	3.25	1753
Unknown		92		65		157		176		116		292		94		71		165
Total	4.36	2441	3.17	1720	3.77	4161	3.24	1853	3.17	1767	3.21	3620	3.32	2066	3.65	2185	3.48	4251
HOUSEHOLD SIZE																		
1-3	5.94	255	4.49	232	5.15	487	3.08	136	2.97	160	3.02	296	2.37	114	2.02	117	2.18	231
4-6	4.20	1003	2.92	677	3.57	1680	2.52	620	2.32	560	2.42	1180	2.62	701	2.77	720	2.69	1421
7-9	3.65	712	2.61	463	3.15	1180	2.35	472	2.53	473	2.43	945	3.29	718	3.90	801	3.62	1519
10+	4.85	383	5.43	246	4.17	629	2.91	236	2.86	213	2.88	449	5.99	529	6.61	531	6.29	1060
Unknown		88		97		185		389		361		750		4		16		20
Total	4.36	2441	3.17	1720	3.77	4161	3.24	1853	3.17	1767	3.21	3620	3.32	2066	3.65	2185	3.48	4251

TABLE B.5
**RATES OF OUT-MIGRATION (PER 100 POPULATION) FROM 101 VILLAGES OF
 MATLAB THANA BY HOUSEHOLD STRUCTURE AND BY SEX,
 1968/69, 1969/70 AND 1972/73**

	1968/69				1969/70				1972/73			
	Male		Female		Male		Female		Male		Female	
	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N
A. NUCLEAR	3.85	1139	2.79	742	2.40	729	2.34	646	3.30	1090	3.59	1071
A. 1 Husband & wife only	5.63	37	4.53	30	4.00	27	3.04	21	4.23	31	4.57	34
A. 2 Husband & wife & unmarried children	3.81	1102	2.74	712	2.36	702	2.32	625	3.28	1059	3.57	1037
B. JOINT FAMILY	4.04	650	3.12	500	2.56	423	2.76	460	2.90	521	3.39	609
B. 1 Husband, wife, unmarried & married children with or without their wives	4.49	152	4.52	136	2.90	101	4.19	131	3.47	131	4.81	162
B. 2 Husband, wife, unmarried & married children with or without their wives, grand children and daughter's husband	4.41	353	3.61	254	2.75	221	2.96	217	2.77	242	3.43	274
B. 3 Husband, wife, unmarried & married children with or without their wives and mother or father	2.97	145	1.84	110	2.01	101	1.80	112	2.71	148	2.58	173
C. SINGLE PERSON FAMILY												
C. 1 Single person family with or without mother or father	9.96	31	4.60	28	5.41	17	3.00	19	10.23	35	8.21	56
D. OTHERS	5.51	531	3.42	352	2.98	295	2.63	281	3.83	412	3.73	429
Unknown	4.36	90	3.17	98		389		361		8		20
Total		2441		1720	3.24	1853	3.17	1767	3.32	2066	3.65	2185
Base Population	56010		54217		57132		55607		62096		59905	

be that the members of the larger households are relatively rich¹ and they are leaving the study area possibly towards urban centres² to avail themselves of the urban opportunities. Any of the above two possibilities may explain the higher out-migration rate among the joint families.

The lowest rate of out-migration among families comprising of young and older generations may arise from the fact that the people of the older generation who have already spent a considerable proportion of their life in the rural areas will find it extremely difficult to sever their time old ties with their places of origin and traditional values in favour of new values and uncertainties of the new areas.

Occupation

Table B.6 presents data on the rate of out-migration by occupation.

TABLE B.6
RATES OF OUT-MIGRATION (PER 100 POPULATION)
FROM 101 VILLAGES OF MATLAB THANA FOR
THE POPULATION 15-49 YEARS BY OCCUPATION*,
1968/69, 1969/70 AND 1972/73

Variable	1968/69		1969/70		1972/73	
	Male		Male		Male	
	Rate	N	Rate	N	Rate	N
OCCUPATION						
Business	8.29	114	2.01	28	3.55	54
Mill and Office	14.15	284	20.47	415	16.83	374
Self Employed	10.36	91	2.01	25	2.36	23
Fishing/boatman	3.74	61	2.24	37	2.99	54
Farming	3.95	311	1.40	112	1.12	98
Labour	5.76	296	1.31	68	1.51	86
Servant	20.74	50		3		2
Unemployed	10.53	192	2.33	43	4.06	82
Others		29		174		206
Unknown		68		145		182
Total	7.00	1496	4.88	1054	4.90	1161
Base Population		56010		57132		62096

* Rates for the females in the occupational structure were not analysed because 92% of the females are unemployed and the cases in rest of the categories are too few to enable meaningful interpretation.

¹ Various studies in Bangladesh have shown positive relationship between land-holdings and family size [4; 14; 15].

² At least two-thirds of the out-migrants from the study area moved towards urban areas (Table C. 5).

Out migration rate by occupation shows the following patterns : for the initial study period (1968/69) the highest out-migration rate is found among domestic servant, followed by mill and office workers and unemployed persons but for the later periods (1969/70 and 1972/73), the highest rate of out-migration was concentrated among mill and office workers, followed by unemployed persons. Migration rates for farmers is found to be consistently very low.

The higher out-migration rate among mill and office workers may arise due to the fact that these people are already exposed to the world outside their villages and they finally move to their places of work to avoid possibly the inconvenience of commuting and also they have the required skills to work outside the rural areas. The higher propensity to move out among the unemployed persons is self-explanatory. The rural unemployed persons are expected to leave for the areas where occupational opportunities are likely to be available. The finding of low out-migration rate among the farmers is not entirely unexpected. The skill of farmers would be least acceptable or would be of the most restricted applicability for work outside a rural area. However, the above finding possibly suggests that those who have some land are less likely to move out from a rural area. Rural to urban migrants particularly those of the lower socio-economic class were found to be largely (81%) landless in a recent study by Chaudhury [9].

In-migration by Marital Status ; Family Size ; Occupation and Family Structure

Tables 1 and 2 of Appendix B present data on the rates of in-migration by marital status, family size, occupation and family structure. However, no attempt is made here to interpret these data in view of the fact that for a majority of the cases the characteristics are unknown.

C. Reasons for Out-migration by Sex

Before the data are presented, it should be mentioned here that the reasons for out-migration were not always collected from a migrant before he or she left the village. In some cases, it was also collected from his or her next of kin who has remained behind or, if an entire family has left from its nearest neighbour. Some may question the reliability of these responses but it should be borne in mind that these responses are obtained from an area and culture where primary group relationships i.e., face-to-face contacts are very dominant and events like moves are widely discussed. However, with this kind of secondary reporting some of the reasons of migration mentioned are general in nature. For example, reasons such as, "Occupational

opportunities" and "better living conditions" do not allow one to identify specific opportunity or condition. But this information is still necessary to identify the factors which are probably taken into consideration in the decision to move.

Tables C.1 and C.2 present data on reasons for out-migration by sex; age and sex, respectively. Table C.1 and C.2 show the following patterns of reasons for out-migration by sex and age and sex: (i) a higher proportion of the males leave their villages in search of "occupational opportunities", followed by those who leave as dependents and those seeking "better living" (Table C.1). The males who leave for "occupational opportunities" and "better living" are selected in the age groups 10 and above but dependents are selected in the age-range 0-9 (Table C.2). The finding of males moving out for occupational opportunities at the age of 10 and above demonstrates that in this society the entrance into the labour force starts as early as in the age of 10; (ii) females show a marked contrasts to males in reasons of migration, a majority of the females leave the villages as "dependents" followed by those women who leave because of marriage (Table C.1). Only about one-sixth as many females as males move because of "occupational opportunities". On the other hand, less than one per cent of males move out because of marriage but for the same reason at least one-fourth of the females leave the villages (Table C.1).

Higher out-migration by males in comparison to females for occupational opportunities may lie in the following facts: that females in comparison to males have limited occupational opportunities; they may possibly have less expertise or skill in comparison to males to work, traditionally females are less used to work outside home and working women are not highly regarded in this society and above all, males unlike females are the principal bread earners. The above reasons plus the fact that women, particularly the village women have very limited scope for physical mobility outside those moves accompanied by their husbands, parents and other relatives may also explain our findings which show that a major proportion of the females move out or in (Table C.3) as dependents, followed by those women who move due to marriage; and (iii) finally, at least 4 times more males than females move out from villages to attend school (Table C.1). Higher out-migration by males in comparison to females for attending schools may arise as a result of differential importance attached to male and female education and differential scope of physical mobility by sex in this society. In this society, male education is considered to be more important than female education and

TABLE C.1
PERCENTAGE DISTRIBUTION OF REASONS FOR OUT-MIGRATION FROM 101
VILLAGES OF MATLAB THANA BY SEX : FOR SPECIFIC YEARS

Reason	1968/69		1969/70		1970/71		1971/72		1972/73	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Occupational opportunities	57.12	9.30	45.35	6.84	27.65	4.70	28.81	3.30	37.38	6.31
Better living	10.64	4.39	11.61	8.08	12.73	5.37	15.58	6.60	13.12	8.46
Dependent	20.14	48.10	25.32	37.04	39.41	40.63	39.90	53.45	33.60	42.13
Marriage	0.24	27.39	0.21	29.58	0.08	34.23	0.33	19.81	0.69	29.50
Divorce/Separation/ Widowed		3.78	0.16	5.26		6.22	0.20	5.91	0.05	3.97
Returning home	3.27	0.81	3.07	0.11	5.27	0.85	3.08	1.18	2.90	0.59
To join husband				6.61		3.72		3.42		4.11
To join other relatives			0.37	1.64	0.24	0.73	0.33	0.50	0.15	0.84
To join parents			1.45	1.30	1.05	0.49	0.27	0.87	0.48	0.59
Attend school	7.00	1.57	8.96	1.47	5.51	0.79	4.02	1.18	7.60	1.37
Others	1.39	2.55	1.72	0.84	7.54	2.19	7.05	3.49	4.30	2.15
Unknown	0.16	0.05	1.72	1.18	0.24	0.06	0.40	0.25	0.29	0.13
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	2442	1719	1852	1768	1233	1639	1489	1605	2065	2186

TABLE C.2

**REASON-PAR-EXCELLENCE FOR OUT-MIGRATION FROM 101
VILLAGES OF MATLAB THANA BY AGE AND SEX, 1968/69,
1969/70, 1970/71, 1971/72 AND 1972/73**

Age	1968/69		1969/70	
	Male	Female	Male	Female
0—4	Dependent	Dependent	Dependent	Dependent
5—9	Dependent	Dependent	Dependent	Dependent
10—14	Occupational opportunities	Marriage	Occupational opportunities	Marriage
15—19	As above	Marriage	As above	As above
20—24	As above	Dependent	As above	Dependent
25—29	As above	As above	As above	As above
30—34	As above	As above	As above	As above
35—39	As above	As above	As above	As above
40—44	As above	As above	As above	As above
45—49	As above	As above	As above	As above
50+	As above	As above	As above	As above

(contd.)

TABLE C. 2 (contd.)

Age	1970/71		1971/72		1972/73	
	Male	Female	Male	Female	Male	Female
0—4	Dependent	Dependent	Dependent	Dependent	Dependent	Dependent
5—9	Dependent	Dependent	Dependent	Dependent	Dependent	Dependent
10—14	Occupational opportunities	Marriage	Dependent	Marriage	Dependent	Marriage
15—19	As above	Marriage	Occupational opportunities	Marriage	Occupational opportunities	Marriage
20—24	As above	Dependent	As above	Dependent	As above	Dependent
25—29	As above	As above	As above	As above	As above	As above
30—34	As above	As above	As above	As above	As above	As above
35—39	Better living	As above	As above	As above	Better living	As above
40—44	*	As above	Better living	As above	Occupational opportunities	As above
45—49	Better living	*	Occupational opportunities	As above	As above	*
50+	As above	Dependent	Better living	As above	Better living	Dependent

Note : The detail data on percentage distribution of reasons of out-migration by age and sex are not presented here but they are available with the authors.

* Frequency cell is less than 10.

this is also substantiated by data [8]. Furthermore, as mentioned before the females in this society have relatively less scope of physical mobility outside village areas in comparison to males. Under the circumstances, we will expect more boys than girls to move out of their villages to receive education.

Reasons for In-migration by Sex and Age and Sex

Tables C.3 and C.4 present data on reasons of in-migration by sex and age and sex. Tables C.3 and C.4 show the following patterns of reasons for in-migration by sex and age and sex : (i) the majority of male in-migrants moved into the study area as dependents, followed by those men who returned home i.e., reverse migrants (Table C.3). The male in-migrants who move into the study area as dependents are mainly selected in the age-groups 0-9 and 10-14 and the reverse migrants are mostly selected in the age-groups 15-19 and 20-24 and also some higher age-groups (Table C.4). The reason for selection of the reverse migrants relatively at the higher ages has already been discussed earlier ; (ii) females on the other hand, moved into the study area as dependents, followed by those women who moved in as brides or because of marriage. The females who moved into the study area as dependents are selected in the age-groups 0-9 and 20 years and above; whereas the females who came in for marriage are selected in the age-groups 10-14 and 15-19. From the above findings, it appears that a majority of males and females move into the study area as dependents. This finding possibly implies that there are not many occupational opportunities in the rural areas. This hypothesis is indirectly borne out by the fact that a higher proportion of males move out from the study area in search of occupational opportunities and better living conditions.

Destination of the Out-migrants

We now present data on the destination of the out-migrants by sex. Before data are presented a point should be mentioned here that although the migrant is reported (either by himself or nearest kin or neighbour) to have left for certain place (s) but in the process of migration the migrant may change his destination. Unfortunately, it has not been possible to follow the migrants to see whether they actually have moved to the locale reported.

TABLE C.3

**PERCENTAGE DISTRIBUTION OF REASONS FOR IN-MIGRATION FROM 101
VILLAGES OF MATLAB THANA BY SEX AND FOR SPECIFIC YEARS**

Reasons	1968/69		1969/70		1970/71		1971/72		1972/73	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Occupational opportunities	16.25	5.94	25.21	6.20	9.38	3.23	10.94	3.41	11.27	3.28
Better living conditions	10.52	7.32	14.82	8.12	13.28	6.23	11.76	6.15	17.80	9.48
Marriage	0.41	26.38	0.67	28.52	0.33	24.13	0.34	19.93	0.46	34.00
Divorce/Separation/ Widowed	0.07	5.52		6.57		4.95	0.06	5.15		6.32
Returning home	19.39	6.28	17.03	4.77	14.24	5.72	15.14	3.27	20.89	4.42
To join husband			1.12			0.61		1.33		1.84
To join parents			0.60	1.42	0.83	0.56	1.17	0.73	1.64	1.45
To join with other relatives			0.93	0.31	0.66	0.33	0.75	0.80	0.98	0.30
Attend School	8.12	0.55	8.11	0.74	3.25	0.33	4.06	0.40	6.32	0.62
Dependent	25.61	42.00	29.85	41.29	38.54	52.83	40.26	55.78	27.88	36.59
Others	19.60	5.93	2.08	0.74	19.49	1.05	15.14	2.80	12.72	1.64
Unknown		0.07	0.67	0.18			0.34	0.20		0.06
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	1464	1448	1491	1613	1811	1798	1453	1495	1517	1582

TABLE C.4

**REASON-PAR-EXCELLENCE FOR IN-MIGRATION INTO 101
VILLAGES OF MATLAB THANA BY AGE AND SEX,
1968/69, 1969/70, 1970/71, 1971/72 AND 1972/73**

Age	1968/69		1969/70	
	Male	Female	Male	Female
0—4	Dependent	Dependent	Dependent	Dependent
5—9	As above	As above	As above	As above
10—14	As above	Marriage	As above	Marriage
15—19	Return home	As above	Return home	As above
20—24	As above	Dependent	Occupational opportunities	Dependent
25—29	As above	As above	As above	As above
30—34	Others	As above	As above	As above
35—39	Occupational opportunities	As above	As above	As above
40—44	Return home	*	As above	As above
45—49	As above	*	As above	*
50+	As above	Dependent	Better living	Dependent

(contd.)

TABLE C. 4 (contd.)

Age	1970/71		1971/72		1972/73	
	Male	Female	Male	Female	Male	Female
0—4	Dependent	Dependent	Dependent	Dependent	Dependent	Dependent
5—9	As above	As above	As above	As above	As above	As above
10—14	As above	As above	As above	As above	As above	Marriage
15—19	As above	Marriage	As above	Marriage	Return home	As above
20—24	Others	Dependent	Return home	As above	As above	Dependent
25—29	As above	As above	Others	Dependent	Better living	As above
30—34	As above	As above	As above	As above	As above	As above
35—39	As above	As above	As above	As above	Return home	As above
40—44	Better living	As above	Better living	As above	Better living	*
45—49	As above	As above	As above	As above	As above	*
50+	As above	As above	Return home	As above	As above	Better living and Dependent

Note : The detail data on percentage distribution of reasons of in-migration by age and sex are not presented here but they are available with the authors.

* Frequency cell by reason in this age sex group was less than 10.

Tables C.5 and C.6 present data on the percentage distribution of out-migration and rate of out-migration by type of receiving population for both sexes and for the selected years under study. It can be seen from Table C.5 that for the entire study period, 63% to 73% and 36% to 24% of the male out-migrants move towards urban areas and rural areas, respectively. The proportion of males out-migrants moving towards urban areas reached its peak in 1972/73 (73%) and dropped to its lowest (64%) in 1970/71. This shows that almost two-thirds of the male out-migrants move to urban areas. But in the case of females, only a simple majority (51%—53%) of them move towards urban areas with the exception of the year 1969/70 and 1970/71, when more women moved towards rural areas. From the above data, it appears that proportionately more males than females move towards urban areas but more females than males move towards rural areas. (The above pattern of movement of the out-migrants by sex could also be traced from Table C.6 which presents data on the out-migration rates by type of receiving population). This finding is consistent with the data showing that in most of Asia and Africa where urbanization is still in an early stage, urban migration is primarily a movement of males [35, pp. 118-20]. This phenomenon is related to differential employment opportunities by sex in conjunction with socio-cultural position of women in society. The differential direction of movement by male and female may also partially be explained by the differences between males' and females' reason for migration and their relationship to urban and rural areas: that is, a higher proportion of males move towards urban areas in search of occupational opportunities and better living conditions whereas a larger proportion of females moving towards rural areas because of marriage (Table C.8). It, therefore, appears that urban and rural areas hold selective opportunities for male and female migration.

Destination of the Out-migrants by Specific Place and Industrial Status of Receiving Places

Characteristics of the receiving population of the out-migrants are further analysed by looking into the specific place of destination and industrialization status of the receiving places. Unfortunately, the above analysis could not be extended beyond the year 1968/69 for lack of data.

TABLE C.5

PERCENTAGE DISTRIBUTION OF OUT-MIGRANTS FROM 101 VILLAGES OF MATLAB
THANA BY TYPE OF RECEIVING POPULATION AND SEX FOR THE YEARS,
1968/69, 1969/70, 1970/71, 1971/72 AND 1972/73

Residential Type	1968/69			1969/70			1970/71			1971/72			1972/73		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Urban ^a	71.36	50.99	62.94	68.47	48.93	58.92	63.50	44.36	52.58	70.32	53.83	61.76	72.64	51.42	61.73
Rural ^b	1742	877	2619	1268	865	2133	783	727	1510	1047	864	1911	1500	1124	2624
Unknown ^c	24.37	45.06	32.92	30.62	50.23	40.19	35.52	55.09	46.69	28.67	45.55	37.43	26.92	48.31	37.92
	595	775	1370	567	888	1455	438	903	1341	427	731	1158	556	1056	1612
	4.28	3.95	4.13	0.92	0.85	0.88	0.97	0.55	0.73	1.01	0.62	0.81	0.44	0.27	0.35
	104	68	172	17	15	32	12	9	21	15	10	25	4	6	15
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	2441	1720	4161	1852	1768	3620	1233	1639	2872	1489	1605	3094	2065	2186	4251

^aUrban area is defined as "Municipalities, Civil lines, and Cantonments not included within municipal limits etc. and any other continuous collection of houses inhabited by not less than 5,000 persons". This definition of an urban area is in conformity with the Census definition of Bangladesh.

^bRural area is just the residual of an urban area.

^cIncludes locations in India.

TABLE C.6

RATE OF OUT-MIGRATION (PER 100 POPULATION) FROM 101 VILLAGES OF MATLAB
THANA BY TYPE OF RECEIVING POPULATION AND SEX FOR THE YEARS,
1968/69, 1969/70, 1970/71, 1971/72 AND 1972/73

Residential Type	1968/69			1969/70			1970/71			1971/72			1972/73		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Urban ^a	3.11 1742	1.62 877	2.38 2619	2.22 1268	1.56 865	1.89 2133	1.33 783	1.27 727	1.30 1510	1.72 1047	1.47 864	1.60 1911	2.42 1500	1.88 1124	2.15 2624
Rural ^b	1.06 595	1.43 775	1.24 1370	0.99 567	1.60 898	1.29 1455	0.74 438	1.53 903	1.15 1341	0.70 427	1.24 731	0.97 1158	0.90 556	1.76 1056	1.32 1612
Unknown ^c	0.19 104	0.13 68	0.16 172	0.03 17	0.03 15	0.03 32	0.02 12	0.02 9	0.02 21	0.02 15	0.02 10	0.02 25	0.01 9	0.01 6	0.01 15
Total	4.36 2441	3.17 1720	3.77 4161	3.24 1852	3.18 1768	3.21 3620	2.09 1233	2.86 1639	2.47 2872	2.45 1439	2.73 1605	2.59 3094	3.33 2065	3.65 2186	3.48 4251
Base Population (Mid-year)	56010	54217	110227	57132	55607	112739	58983	57243	116231	60879	58804	119683	62096	59905	122001

^aUrban area is defined as "Municipalities, Civil lines and Cantonments not included within municipal limits etc. and any other continuous collection of houses inhabited by not less than 5,000 persons". This definition of an urban area is in conformity with the Census definition of Bangladesh.

^bRural area is just the residual of an urban area.

^cIncludes locations in India.

Table C.7 presents data on places of destination of the out-migrants and industrial status of the receiving places. It can be seen from Table C.7 that a higher percentage (45%) of males move to Dacca followed by Comilla (24%). On the other hand, a higher percentage (48%) of the females, move within Comilla, the district of origin, followed by those females who move to Dacca (28%). This finding of relatively long distance move by male in comparison to female is also confirmed elsewhere [27,pp. 167-235; 28,pp. 241-305]. Replication of this finding in the context of Bangladesh may arise from the following facts : (i) that the females usually move out as dependents (Table C.1) and a majority of them are not being accompanied by their husbands or relatives possibly in view of the unfamiliarity with the new areas/uncertainties in finding job/difficulties in finding accommodations etc.; or (ii) due to a decision on the part of the male out-migrants to leave their families or dependents behind with a view to not severing their ties from the village homes. It can also be observed from Table C.7 that a higher percentage (47%) of the males move to larger industrial places while a higher percentage of females (45%) move to non-industrial areas. This finding may be partially explained by males' and females' reasons for migration and their relation to industrial and non-industrial areas. Males usually move out for occupational opportunities which are likely to be available more in the larger industrial places than in other places, while one of the principal reasons for female out-migration is marriage and the marriage of a village girl is more likely to take place in another village.

Place of Origin of the In-migrants

Tables C.9 and C.10 present data on percentage distribution of in-migrants by place of origin and sex. It can be seen from Table C.9 that a majority of male in-migrants came from urban areas. But for female in-migrants, the common place of origin is the rural area. This pattern of origin of the in-migrants by sex is also evident in Table C.10 which presents data on the in-migration rate by place of origin and sex. The finding of higher proportion of male in-migrants from the urban regions may arise from the fact that in this category we included a large proportion of reverse migrants (Table C.11). We know from our finding that almost two-thirds of the male out-migrants move towards urban regions (Table C.5). Among these rural to urban migrants, some are not settled in the urban regions for one reason or the other and they eventually come back to their places of origin. These reverse migrants on the average constitute 22% of the total male in-migrants originating from the urban regions over the entire study period (Table C.11). We can, therefore, say that inclusion of these reverse-migrants is a

TABLE C.7

**PERCENTAGE DISTRIBUTION OF THE OUT-MIGRANTS FROM 101
VILLAGES OF MATLAB THANA BY TYPES OF RECEIVING
PLACES AND SEX, 1968/69**

Variables	1968/69		
	Male	Female	Total
	Per cent	Per cent	Per cent
PLACES OF DESTINATION			
Comilla	24.39	47.97	34.06
Dacca and Narayanganj	44.92	28.16	38.05
Chittagong and Barisal	14.68	10.14	12.82
Jessore and Khulna	7.09	5.01	6.24
Pabna and Rajshahi	3.06	3.16	3.11
Other districts	1.57	1.19	1.42
West Pakistan	1.04	1.73	1.32
India	2.28	2.21	2.25
Unknown	0.95	0.42	0.73
Total	100.00	100.00	100.00
Number	2441	1720	4161
INDUSTRIAL SIZE*			
<2,000	4.39	3.20	3.92
2,000-9,999	6.60	6.33	6.48
10,000-19,949	9.33	9.79	9.52
20,000-39,999	7.30	6.21	6.85
40,000+	47.41	25.36	38.36
Non-Industry	21.65	45.17	31.29
W. P. and India	3.31	3.94	3.57
Total	100.00	100.00	100.00
Number	2441	1720	4161

*Industrial Size is categorized on the basis of number of Industrial workers-collected from the Bureau of Industries.

TABLE C.8
 PERCENTAGE DISTRIBUTION* OF REASONS FOR OUT-MIGRATION FROM 101 VILLAGES
 OF MATLAB THANA BY TYPE OF RECEIVING POPULATION AND SEX,
 1968/69, 1969/70, 1970/71, 1971/72 AND 1972/73

Reasons	1968/69				1969/70			
	Urban		Rural		Urban		Rural	
	Male	Female	Male	Female	Male	Female	Male	Female
Occupational opportunities	63.26	13.22	41.68	4.64	51.43	10.29	32.45	3.60
Better living conditions	10.27	7.64	11.09	4.90	9.15	11.33	16.75	4.95
Marriage		9.23		48.77		13.06		46.28
Divorce/Separation/ Widowed				7.35				9.91
Returning home	0.57		11.76	1.54			8.46	
To join with husband						8.90		4.50
To join with parents					1.02			1.57
To join with other relatives						1.38		1.91
Dependent	18.25	65.45	23.36	27.35	25.78	49.82	23.80	23.53
Attend school	6.71	1.59	8.90	1.67	8.59	2.08	10.05	
Others	0.63	1.25	2.68	3.74	1.34		2.82	
Unknown					1.34		1.94	1.68
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	1742	877	595	775	1268	865	567	888

(Contd.)

TABLE C. 8 (Contd.)

Reasons	1970/71				1971/72				1972/73			
	Urban		Rural		Urban		Rural		Urban		Rural	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Occupational opportunities	34.48	7.70	15.75	2.32	33.52	4.39	17.33	2.05	44.33	9.61	18.88	2.34
Better living conditions	8.04	6.05	21.00	4.65	12.22	7.17	24.35	6.01	11.00	10.49	19.06	6.25
Marriage		12.79		51.93		5.44		37.07		10.58		49.71
Divorce/Separation/ Widowed		1.51		9.96		2.20		10.39		0.97		7.10
Returning home			12.78	1.32			9.36	2.18			10.25	3.97
To join with husband		4.67		2.99		3.47		3.42		4.27		3.97
To join with parents												
To join with other relatives										0.88		
Dependent	49.23	61.48	38.53	24.14	39.92	68.75	40.75	35.02	31.46	57.20	40.10	26.04
Attend School	5.23		6.16		4.87	1.73			8.03	1.95	6.47	
Others	9.57	3.02	4.10	1.10	7.73	4.86	4.91	1.77	4.26	3.11	3.23	1.13
Unknown												
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	783	727	438	993	1047	864	427	731	1500	1124	556	1056

*Percentage for cases less than 10 were not calculated.

TABLE C.9
PERCENTAGE DISTRIBUTION OF IN-MIGRANTS INTO 101 VILLAGES OF
MATLAB THANA BY TYPE OF PLACE OF ORIGIN AND SEX FOR THE
YEARS, 1968/69, 1969/70, 1970/71, 1971/72 AND 1972/73

Residential Type	1968/69			1969/70			1970/71			1971/72			1972/73		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
Urban ^a	59.83 876	42.74 619	51.34 1495	56.60 844	36.39 587	46.10 1431	64.88 1175	46.27 832	55.61 2007	64.62 939	48.90 731	56.64 1670	63.41 962	38.87 615	50.88 1577
Rural ^b	39.82 583	56.76 822	48.25 1405	43.06 642	63.36 1022	53.61 1664	34.84 631	53.67 965	44.22 1596	35.23 512	51.03 763	43.25 1275	36.58 555	61.12 967	49.11 1522
Unknown ^c	0.34 5	0.48 7	0.41 12	0.33 5	0.24 4	0.29 9	0.27 5	0.06 1	0.16 6	0.14 2	0.06 1	0.10 3			
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	1464	1448	2912	1491	1613	3104	1811	1798	3609	1453	1495	2948	1517	1582	3099

^aUrban area is defined as "Municipalities, Civil Lines and Cantonments not included within municipal limits etc., and any other continuous collection of houses inhabited by not less than 5,000 persons". This definition of an urban area is in conformity with the census definition of Bangladesh.

^bRural area is just the residual of an urban areas.

^cIncludes locations in India.

TABLE C.10

**RATE OF IN-MIGRATION (PER 100 POPULATION) INTO 101 VILLAGES OF
MATLAB THANA BY TYPE OF PLACE OF ORIGIN AND SEX FOR THE
YEARS, 1968/69, 1969/70, 1970/71, 1971/72 AND 1972/73**

Residential Type	1968/69		1969/70		1970/71		1971/72		1972/73						
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total			
Urban ^a	156 876	114 619	135 1495	147 844	105 587	127 1431	199 1175	145 832	172 2007	154 939	124 731	139 1670	155 982	102 615	129 1577
Rural ^b	104 583	151 822	127 1405	112 642	183 1022	147 1664	107 631	168 965	137 1596	084 512	129 763	106 1275	089 555	161 967	124 1522
Unknown ^c	5	7	12	5	4	9	5	1	6	2	1	3			
Total	261 1464	267 1443	264 2312	261 1491	290 1613	275 3104	307 1811	313 1798	310 3609	238 1453	254 1495	246 2948	244 1517	264 1582	254 3099
Base Population	56010	54217	110227	57132	55607	112739	58983	57243	116231	60379	58804	119683	62096	59905	122001

^aAs in Table C. 5.^bAs in Table C. 5.^cAs in Table C. 5.

TABLE C.11

**PERCENTAGE DISTRIBUTION OF REASONS FOR IN-MIGRATION INTO 101 VILLAGES OF
MATLAB THANA BY TYPE OF PLACES OF ORIGIN AND SEX,
1968/69, 1969/70, 1970/71, 1971/72 AND 1972/73**

Reasons for in-migration	1968/69				1969/70				1970/71			
	Urban		Rural		Urban		Rural		Urban		Rural	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Occupational opportunities	11.30	6.94	23.84	5.11	26.30	7.32	23.98	5.57	9.02	4.44	9.98	2.17
Better living conditions	10.16	9.53	11.15	5.59	13.03	12.43	17.13	5.57	10.80	8.41	18.06	4.35
Marriage		4.52		42.82		4.60		42.27		4.08		41.45
Divorce/Separation/ Widowed		2.26		8.03		3.06		8.61		2.40		7.15
Dependent	27.96	60.42	21.78	28.22	28.43	58.26	31.62	31.50	33.95	68.38	47.22	39.37
Study	2.62		16.46		3.20		14.64		1.62		6.34	
Returning home	25.00	10.34	11.15	3.16	24.52	9.20	7.00	2.25	18.12	9.13	6.81	2.79
To join with husband								1.17				
To join with parents									1.19			
To join with other relatives						2.38			0.93			
Unknown												
Others	22.72	5.33	14.75	6.44	2.13		2.02	1.07	24.17	1.20	10.77	
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	876	619	583	822	844	587	642	1022	1175	832	631	965

TABLE C. 11 (Contd.)

Reasons	1971/72				1972/73			
	Urban		Rural		Urban		Rural	
	Male	Female	Male	Female	Male	Female	Male	Female
Occupational opportunities	7.13	4.10	17.96	2.75	8.42	3.25	16.21	3.31
Better living conditions	11.18	6.43	12.89	5.89	19.54	13.33	14.77	7.03
Marriage		2.60		36.43		7.80		50.67
Divorce/Separation/ Widowed		2.05		8.12		3.90		7.75
Dependent	41.00	74.69	39.06	37.74	28.06	56.74	27.56	23.78
Study	1.81		8.20				14.41	
Returning home	19.27	5.06	7.61	1.57	26.19	8.45	11.71	1.96
To join with husband				2.09				2.17
To join with parents	1.33				1.97	1.95		1.13
To join with other relatives					1.04			
Unknown								
Others	17.57	3.00	10.35	2.62	12.68	2.11	12.79	1.34
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Number	939	731	512	763	962	615	555	967

contributory factor for finding a higher proportion of male immigrants from the urban regions. On the other hand, a higher representation of the rural females moving into the study area due to marriage and an over-whelming under-representation of the urban females moving into the study area due to marriage accounts for a higher average rural dominance over the female immigrants (Table C.11).

Reasons of In-migration by Types of Place at Origin

Table C.11 presents data on the reasons of in-migration by sex and type of places of origin. It can be seen from Table C.11 that the males from both urban and rural areas moved into the study area mainly as dependents. It was mentioned before that this finding may be attributed to the lack of occupational opportunities in the villages of the study area. It can also be seen from Table C.11 that urban originated females moved into the study area as dependents while the rural originated females moved into the study area because of marriage. Marriage as a dominant factor of moving into the study area among the rural originated female immigrants and its negligible presence among the urban originated female immigrants may result from the prevailing marriage practices in this society. Marriage in this society usually takes place between communities of the same type. The village boys usually marry the village girls either by their own preference or by preference of their parents or for any other reason and therefore, the scope of marriage between village boys and urban girls is very limited. The above hypothesis also emerges from our findings which show that females move out to rural areas mainly because of marriage while they move out to urban areas as dependents (Table C.8). These findings clearly demonstrate that village to village marriage is still the dominating practice of marriage in a rural society of Bangladesh.

D. Net-migration to urban Areas

Table D.1 presents data on the rate of net migration to urban areas by sex for the entire study period.

TABLE D.1

**RATE OF NET-MIGRATION (PER 100 POPULATION)
FROM 101 VILLAGES OF MATLAB THANA TO
URBAN AREAS ONLY BY SEX FOR THE YEARS,
1968/69, 1969/70, 1970/71, 1971/72 AND 1972/73**

Year	Male		Female		Total	
	Rate	N	Rate	N	Rate	N
1968/69 Base Population	-1.55	56010	-0.48	54217	-1.02	110227
1969/70 Base Population	-0.74	57132	-0.50	55607	-0.62	112739
1970/71 Base Population	+0.66	58983	+0.18	57248	+0.43	116231
1971/72 Base Population	-0.18	60879	-0.23	58804	-0.20	119683
1972/73 Base Population	-0.87	62096	-0.85	59905	-0.86	122001

It is evident from Table D.1 that for almost every year under study with the lone exception of the year 1970/71, net migration to urban areas is consistently negative for both male and female. This means that the study areas send more people to the urban areas than they receive from them. In 1970/71, more people from the urban areas moved into the study areas (i.e., rural areas) than the study areas could send to the urban areas. This lone departure from the trend is largely due to the effect of the Bangladesh war of liberation of 1970/71. It can be seen from Table D.1 that net rural to urban migration rate is consistently higher for males than the corresponding rates for females with the exception of the year of 1971/72 when net rural to urban migration rates was a little higher for females than males. This departure from the trend was mainly due to the left over effect of the war of liberation of Bangladesh in 1970/71. During the war period i.e., in 1970/71, a good proportion of females in comparison to males moved from the urban areas to the study area as dependents (Table C.11). These female dependents were possibly returning to their places of origin i.e., urban areas along with some fresh recruits in 1970/71 and a reflection of this is to be found in the highest out-migration of female dependents to urban areas in 1971/72 (Table C.8) and this would possibly explain the relatively higher female net rural to urban migration of 1971/72.

It can be observed from Table D.1 that the net female rural to urban migration rate has increased by 77% in 1972/73 from its level of 1968/69. The above finding possibly implies that in comparison to the year 1968/69, more women in 1972/73 are either moving along with their husbands to urban areas or they are joining their husbands in the urban areas. The higher female net rural to urban migration in 1972/73 in comparison to 1968/69 may arise from the fact that in the earlier days, husbands possibly used to leave their wives behind in the rural areas while they move to urban areas to work. This means that the husbands used to keep two establishments; one in the rural area for their family and the other in the urban area for themselves. But in 1972/73, maintenance of two establishments is possibly found to be no longer financially feasible and this may have caused the wives to leave their village homes to stay with their husbands in the urban areas.

The figure of total net-migration rate to urban areas in a given year may appear very small but its contribution to the overall growth of urbanization in Bangladesh may not be insignificant. For the sake of illustration, we can estimate what would be the proportional increase of urban population resulting from rural to urban migration if the net rural to urban migration rate for all the rural areas of Bangladesh were the same as that of Matlab. However, the estimate derived from the above assumption should be treated with caution since the net rural migration rates as are found for the villages of Matlab may not truly represent the national net rural to urban migration rate. Table D.2 presents data on estimated proportional increase in urban population of Bangladesh in 1974 if the national net rural to urban migration rates were the same as were found for Matlab in the years 1968/69 and 1972/73, the two most normal years of the study periods. The procedure of estimating the proportional increase in the urban population of Bangladesh in 1974 due to net migration from rural to urban areas is as follows :

$$U_i = \frac{[P - (P) (E_u)] \cdot R_n}{(P) (E_u)}$$

Where U_i = proportional increase in urban population in 1974.

P = is the total population of Bangladesh in 1974 which is 7,14,79,071 [11].

E_u = proportion of urban population to total population in 1974 which is .0878.

R_n = net rate of migration from rural to urban areas in

1968/69 and 1972/73 for the villages of Matlab. The net (total) rural to urban migration rates for 1968/69 and 1972/73 are 1.02 and 0.86, respectively.

It can be seen from Table D.2 that if the urban population is 8.7 per cent of the total population of Bangladesh in 1974, it would increase by 11 per cent and 9 per cent from rural out-migration alone if the net rural to urban migration rates for all the rural areas of Bangladesh were the same as that for Matlab in 1968/69 and 1972/73, respectively.

TABLE D.2

**ESTIMATED PROPORTIONAL INCREASE IN URBAN POPULATION
OF BANGLADESH IN 1974 RESULTING FROM NET-MIGRATION
FROM RURAL AREAS TO URBAN AREAS**

Net-migration from Rural Areas (per 100 persons) to Urban Areas	Percentage Urban in 1974=8.7
	Percentage Increase in Urban
1.02 (1968/69)	10.98
0.86 (1972/73)	9.25

IV. CONCLUDING REMARKS

The findings of males net-migration from the study areas and selection of young adult males, among the out and net migrants have several important bearings upon socio-demographic events of Bangladesh : (i) The continuous net-migration from rural to urban areas as it is found here may lead to rapid growth of urban population in the country. The rapid growth of urban population has serious implications on the delivery of social services in the urban areas. The urban areas of Bangladesh are already facing the shortage in housing, employment, transporation, pure drinking water, sewerage, electricity, etc. [2;9]. The shortage for the above services in urban areas is likely to be further aggravated with the continuous stream of migration from rural to urban areas ; (ii) The stream of rural-urban migration has bearing not only on the delivery of social services in the urban areas but it may also

effect the regional development and demographic balance in both rural and urban areas. We have found that male out-migrants are largely selected in the young adult ages (20-24) and evidence collected elsewhere in Bangladesh shows that the rural to urban migrants are relatively better educated than the national population [9]. The above findings have far-reaching implication on regional development. For example, continuous moving out of young adults and better educated persons from the rural areas, leaving behind old and less educated persons in the rural areas may cause an imbalance in the quality of population between rural and urban areas and may eventually impede rural development programmes which needs participation of young adults as well as the better educated. Similarly, continuous outflow of adult persons from the rural areas to the urban areas may lead to an aging of rural population and rejuvenation of urban population which may lead to changes in the fertility and mortality patterns in both the urban and rural areas. Fertility in the urban areas may go up if it continues to have proportionately more people in the adult ages. On the other hand, the fertility in the rural areas may go down if it continues to lose population of high fertility potentials i.e., those who are in the adult ages. Similarly, aging in the rural areas and rejuvenation in the urban areas may increase the morality level of the rural areas in comparison to urban areas simply because of age effect. Keeping other factors constant, an old population has higher mortality in comparison to a young population because old people are prone to death due to degenerative processes than the people of adult ages; (iii) Rural to urban migration may also lead to problems of personal and social tensions. It is found that there is a tremendous gap between the needs and available services in the urban region of Bangladesh [2; 9]. Sooner or later this gap, and the rising expectations¹ resulting from urban living may lead to personal and social tensions in the urban areas of Bangladesh.

We have so far painted a bleak picture of rural-urban migration and de-emphasised the merits of rural-urban migration which has certain points in its favour. For example, (i) it enhances one's chance of upward social mobility because avenues for learning new skills and exploring talents in urban areas are relatively higher in comparison to rural areas; (ii) one's potential income or life-time earnings is expected to

¹ According to a recent survey 96.33% of the lower socio-economic stratum (slum dwellers) of the urban immigrants expect definite help from the government and of these 72% demand community facilities such as drinking water, sewerage, electricity, school, medical centre, recreation, street pavement, house improvement, etc. [36].

be higher in the urban regions because of rural-urban wage differentials ; (iii) urban areas provide one with more basic amenities of life such as health, education, recreation etc. However, chances of availing oneself with the above opportunities vary positively with one's socio-economic status and as long as the new entrants into the urban areas do not put pressure upon existing resources of the urban areas. With the urban areas already facing severe problems, any further influx of people from rural to urban areas may mean more trouble. It, therefore, calls for slowing the stream of rural-urban migration. To hold the potential out-migrants from rural areas, we offer the following tentative recommendations : (i) *creation of job opportunities in the rural areas* : we have found that people move out from rural to urban areas in search of occupational opportunities. To hold the potential rural out-migrants, we will have to generate economic activities in the rural areas by revitalizing the agricultural and non-agricultural sectors of the economy ; (ii) *narrowing the gap between rural and urban wages* : various studies have shown that individuals base their decision to migrate on the consideration of income maximization and higher income potential in the urban regions [34,pp.172-222]. It, therefore, suggests that along with the creation of employment opportunities in the rural areas, we will have to narrow down the existing rural-urban wage differentials¹ the country ; (iii) *overall rural development programme* : to hold the potential out-migrants from the rural areas, we also need to introduce some modern amenities of life such as pure drinking water, schools and hospitals in the rural areas. At present, most of the modern amenities of life are localized in the urban areas.²

¹ The ratio of rural to urban wage in Bangladesh is found to be less than unity for 14 different years in between 1956—1973 in a recent study by M. Alamgir [1, pp. 737-818].

² For example, till June 1973, there were 12311 hospital beds in the country and of these 81.61% were in the urban areas. Of the total medical doctors, over 75% are working in the urban areas only. The rural areas are almost without any access to pure drinking water and electricity. For details see Government of Bangladesh, *The First Five Year Plan, 1973—78* [12, p. 499].

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Appendix A

TABLE I

ANNUAL RATE OF GROWTH (EXPONENTIAL) URBAN, RURAL
AND TOTAL POPULATION OF BANGLADESH BY
CENSUS YEARS (1901-1974).

Census Years	Annual Growth Rate (Per cent)		
	Urban	Rural	Total
1901-1911	1.39	0.85	0.87
1911-1921	0.84	0.51	0.53
1921-1931	2.00	0.64	0.68
1931-1941	3.59	1.58	1.65
1941-1951	1.63		
1951-1961	3.72	1.83	1.92
1961-1974	6.70	2.33	2.62

TABLE I
RATES OF IN-MIGRATION (PER 100 POPULATION) FROM 101 VILLAGES OF
MATLAB THANA BY MARITAL STATUS, FAMILY SIZE AND OCCUPATION
AND BY SEX, 1968/69, 1969/70 AND 1972/73

Variable	1968/69				1969/70				1972/73			
	Male		Female		Male		Female		Male		Female	
	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N
MARITAL STATUS												
Single	1.06	366	1.04	273	0.90	319	0.66	180	1.88	728	1.49	441
Ever married	1.32	275	2.82	764	0.78	168	2.53	712	1.86	434	3.49	1060
Unknown		823		411		1004		721		355		81
Total	2.61	1464	2.67	1448	2.61	1491	2.90	1613	2.44	1517	2.64	1582
HOUSEHOLD SIZE												
1-3	1.25	54	1.27	66	1.33	59	0.98	53	1.83	88	1.46	85
4-6	0.93	224	0.98	227	0.92	226	0.61	147	1.26	337	1.02	265
7-9	0.80	157	0.72	129	0.80	121	0.43	81	0.91	200	0.91	185
10+	0.83	68	0.65	47	0.67	55	0.77	58	0.93	82	0.81	65
Unknown		963		979		1030		1274		810		982
Total	2.61	1464	2.67	1448	2.61	1491	2.90	1613	2.44	1517	2.64	1592
OCCUPATION												
Business	0.77	14			0.96	18			0.98	20		
Mill & Office	4.00	91	4.89		4.89	114			6.31	160		
Self employed		8			1.08	12			1.49	18		
Fishing/boatman	0.85	19	0.60	14	0.60	14			1.20	30		
Farming	0.73	102	0.55	80	0.55	80			0.99	156		
Labour	0.58	41	1.24	89	1.24	89			1.41	110		
Servant		3				3						
Employed	0.43	124	0.37	100	0.37	100			1.06	306		
Others	42.35*	194	41.45*	194	41.45*	194			49.31*	251		
Unknown		868		867		867				466		
Total		1464	2.67	1448	2.61	1491	2.90	1613	2.44	1517	2.64	1582
Base Population	56010		54217		57132		55607		62096		59905	

Note : Rates for the females in the occupation structure were not analysed separately because 94% of the females are in the category of unemployed/or unknown and the cases in the rest of the categories are too small to permit any meaningful analysis.

* In this category at least 80% are students.

TABLE II
 RATES OF IN-MIGRATION (PER 100 POPULATION) FROM 101 VILLAGES OF
 MATLAB THANA BY HOUSEHOLD STRUCTURE AND BY SEX,
 1968/69, 1969/70 AND 1972/73

Family Structure	1968/69						1969/70						1972/73					
	Male		Female		Male		Female		Male		Female		Male		Female		Male	
	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N	Rate	N
A. NUCLEAR	1.07	318	1.10	293	0.82	249	0.58	161	1.17	386	1.09	327						
A. 1 Husband & wife only	1.52	10	1.66	11	1.78	12	1.59	11	1.90	14		8						
A. 2 Husband & wife & un-married children	1.06	368	1.08	282	0.80	237	0.56	150	1.15	372	1.09	319						
B. JOINT FAMILY	0.57	91	0.65	104	0.73	121	0.60	101	1.03	185	0.88	153						
B. 1 Husband, wife, unmarried children & married sons with or without their wives	0.56	19	0.79	24	0.81	28	0.57	18	1.22	46	0.89	30						
B. 2 Husband, wife, unmarried children & married sons with or without their wives, grand children and daughter(s) with husband	0.40	32	0.37	26	0.80	65	0.82	60	1.08	95	1.00	79						
B. 3 Husband, wife, unmarried & married sons with or without their wives and mother or father	0.82	40	0.90	54	0.56	28	0.37	23	0.80	44	0.74	50						
C. SINGLE PERSON FAMILY																		
C. 1 Single person family with or without mother or father	3.86	12		9		6		6		8	1.61	11						
D. OTHERS	0.96	85	0.66	64	1.04	93	0.72	77	1.19	128	0.89	135						
Unknown		958		978		1022		1268		810		992						
Total	2.61	1464	2.67	1448	2.61	1491	2.90	1613	2.44	1517	2.64	1558						
Base Population	56010		54217		57132		55607		62096		59905							

Foreign Capital Inflow and Domestic Savings : A Technical Note

by

T. ADEMOLA OYEJIDE*

I. INTRODUCTION

There has been a good deal of debate and controversy on the desirability of the inflow of foreign capital into less developed countries as a means of speeding up the process of economic development in these countries. One of the major elements in this debate has to do with the impact of foreign capital inflow on domestic savings, and hence the ability of an economy which has been exposed to the inflow of foreign capital to generate a self-sustained rate of growth over time. This debate has been re-opened in a recent paper by Dr. Mohiuddin Alamgir [1], whose results more or less confirm the position of those who claim that "foreign capital inflow adds to national saving and investment and therefore income positively".¹ These results do not, however, necessarily completely destroy the position of those who insist that "foreign capital inflow has negative effect on national saving".²

Apart from this and other studies³ which have so far been carried out, attempts to determine the impact of foreign capital inflow on domestic savings and income can also take the form of explicit theoretical models whose functional relationships can be manipulated to derive the conditions, given a set of plausible assumptions, under which foreign capital inflow would be related to national savings and income in some specified (positive or negative) ways. Bacha [2] has produced some interesting

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¹ M. Alamgir [1, p. 577.]

² M. Alamgir, *op. cit.*, p. 577.

³ Some of the more important contributions are listed under references.

results, along these lines, with respect to the relationship between foreign capital inflow and the growth of national output or income.

The purpose of this note is to use a theoretical framework similar to Bacha's to examine the relationship between foreign capital inflow and domestic savings. In the rest of this note, a simple basically neo-classical model is developed and analysed in terms of its implications for the behaviour of domestic savings in the presence of foreign capital inflow (section II). The concluding remarks are presented in section III.

II. A NEO-CLASSICAL MODEL AND ITS IMPLICATIONS

The conventional general production function has capital stock (K) and labour (L) as its arguments. It is assumed to be twice differentiable. It can be represented as follows :

$$(1) \quad Y = F (K, L).$$

This production function is defined for $K \geq 0$ and $L \geq 0$.

In this note, we are interested in two kinds of capital — the two types are distinguished by ownership in terms of whether it is foreign or local — and, for ease of analysis, labour can be assumed to be given and fixed. Hence, equation (1) can, for our purposes be rewritten as

$$(2) \quad Y_t = f (K_1, K_2),$$

with the side constraints that

$$\begin{aligned} f_1 &> 0, & f_{11} &< 0; \\ f_2 &> 0, & f_{22} &< 0 \end{aligned}$$

where Y_t represents total income,

K_1 represents local capital stock,

K_2 represents foreign-owned capital stock;

and the first partials (f_1, f_2) may be interpreted as marginal products of local and foreign capital respectively.

Total income adds up local income (Y_1) and net earnings of foreigners from their capital. This definition is reflected in the following equation :

$$(3) \quad Y_1 = Y_t = \pi_f$$

where π_f represents net earnings of the owners of foreign capital.

This earning is, in turn, related to foreign capital stock as follows :

$$(4) \quad \pi_f = rK_2,$$

where r is the required rate of return on their capital which, it is assumed, is necessary to keep foreign capital stock owners happy.

The rest of the model is the demand side which is made up of a simplified Keynesian component. This sub-set is described by the following group of familiar equations :

$$(5) \quad Y_t = C + I + (X - M).$$

$$(6) \quad C = cY_1 \text{ ...consumption function,}$$

where c is the marginal propensity to consume which is constrained to be $0 < c < 1$.

$$(7) \quad I = I_1 + I_2.$$

The investment function is composed of local investment (I_1) and foreign investment (I_2)

$$(8) \quad M - X = dK_2 - \pi_f \text{ ...investment-savings gap.}^4$$

This equation says that the gap between imports (M) and exports (X) is filled by net capital inflow ($dK_2 - \pi_f$).

Now, from equations (5), (6) and (8), the following is derived :

$$(9) \quad Y_t = cY_1 + I + (\pi_f - dK_2).$$

From equation (9), we can derive another expression for the investment function, using equation (4) to eliminate π_f :

$$(10) \quad I = (sY_t - srK_2) + dK_2,$$

⁴ The investment-savings gap concept is familiar from the two-gap model of Chenery and Associates. This is described in [3; 4].

where $s = (1 - c)$ is the marginal propensity to save which is subject to the usual constraint that $0 < s < 1$. Clearly, in the light of equation (7),

$$I_1 = (sY_t - srK_2); \text{ and}$$

$$I_2 = dK_2.$$

To examine the impact of foreign capital inflow on total income, let us start with the total differentiation of equation (2). This gives

$$(11) \quad dY_t = f_1 dK_1 + f_2 dK_2$$

which, in combination with equation (10), becomes

$$(12) \quad dY_t = f_1 (sY_t - srK_2) + f_2 dK_2.$$

The rate of growth of total income is then given as

$$(13) \quad \frac{dY_t}{Y_t} = f_1 s + \frac{f_2 K_2}{Y_t} \left\{ \frac{dK_2}{K_2} - \frac{f_1}{f_2} (sr) \right\}.$$

This equation says that the rate of growth of total income is made up of two terms; the first term represents the contribution of local capital while the second term represents the contribution of foreign capital. Clearly, the impact of foreign capital inflow on the rate of growth of total income depends on the magnitude and sign of

$$\left\{ \frac{dK_2}{K_2} - \frac{f_1}{f_2} (sr) \right\}.$$

Thus, for foreign capital inflow to contribute positively to the rate of growth of total income, this model requires that the growth rate of foreign capital be positive and greater than the product of three parameters: the marginal rate of substitution between local and foreign capital (f_1/f_2), the marginal propensity to save and the rate of return on foreign capital. A simpler result can be derived by assuming a perfectly competitive economic system in which the marginal products of local and foreign capital are identical at the point of optimal utilization; i.e.,

$$f_1 = f_2 = f'.$$

This assumption transforms equation (13) into the following:

$$(14) \quad \frac{dY_t}{Y_t} = f' s + \frac{f' K_2}{Y_t} \left\{ \frac{dK_2}{K_2} - sr \right\}.$$

This new formulation⁵ implies that the contribution of foreign capital inflow to the growth rate of income is positive only when the growth

⁵ This formulation is essentially the same as in Bacha [2, p. 376].

rate of foreign capital is positive and greater than the product of two parameters: the marginal propensity to save and the rate of return on foreign capital.

We may now turn to an examination of the impact of foreign capital inflow on the behaviour of local savings. As a starting point, a simple savings function, derivable from equation (6) is given by

$$(15) \quad S_1 = sY_1; 0 < s < 1$$

which, given equation (3), becomes

$$(16) \quad S_1 = sY_t - s\pi_f.$$

The growth rate of local savings is derived by first totally differentiating equation (16) to obtain

$$(17) \quad \frac{dS_1}{S_1} = \frac{f_1 s (sY_t - srK_2)}{sY_t - srK_2} + \frac{s(f_2 dK_2 - rdK_2)}{sY_t - srK_2}$$

This simplifies into

$$(18) \quad \frac{dS_1}{S_1} = f_1 s + \frac{dK_2}{Y_1} \{ f_2 - r \}.$$

Equation (18) says that the growth rate of local savings is made up of two terms: the first term is the contribution of local capital and the second is the contribution of foreign capital. The contribution of foreign capital inflow is positive only if

$$f_2 > r$$

that, is, if the marginal productivity of foreign-owned capital is positive and greater than the profit rate demanded by the owners of the foreign capital.

Equation (18) represents one way of looking at the impact of foreign capital inflow on local savings. Another way is to relate change in local savings to change in total income resulting from the presence of foreign capital inflow. This relationship is derived as follows:

From equation (16)

$$(19) \quad \frac{dS_1}{dY_t} = s - s \left\{ \frac{d\pi_f}{dY_t} \right\}$$

which, given equation (4), transforms into

$$(20) \quad \frac{dS_1}{dY_t} = s - sr \left\{ \frac{dK_2}{dY_t} \right\}$$

using equation (11) equation (20) can be re-expressed as

$$(21) \quad \frac{dS_1}{dY_t} = s + sr \left\{ \frac{1}{f_2} \right\} \left\{ f_1 \frac{dK_1}{dY_t} - 1 \right\}.$$

Again, from equation (11), it is clear that

$$(22) \quad f_1 \frac{dK_1}{dY_t} + f_2 \frac{dK_2}{dY_t} = 1.$$

$$(23) \quad \left\{ f_1 \frac{dK_1}{dY_t} - 1 \right\} < 0.$$

Therefore, foreign capital inflow has a negative impact on change in local savings as a proportion of change in total income, the magnitude of this impact depends on the gap represented by equation (23).

A slightly different interpretation of this result emerges by re-writing equation (22) as follows :

$$(24) \quad \frac{dS_1}{dY_t} = s - s \left(\frac{r}{f_2} \right) \left\{ 1 - f_1 \frac{dK_1}{dY_t} \right\}.$$

This equation shows that the negative impact of foreign capital inflow on the change in local savings as a proportion of change in total income is related to the share of foreign capital out of total income. Furthermore, if owners of foreign capital take a profit rate which is exactly equal to the marginal product of foreign capital (i.e., $r = f_2$) then equation (24) reduces to

$$(25) \quad \frac{dS_1}{dY_t} = sf_1 \frac{dK_1}{dY_t}$$

which means that the change in local savings emanating from a change in total income is related only to the share of total income taken by local capital.

III. CONCLUDING REMARKS

This note has tried to demonstrate that, apart from empirical studies (based on cross-section, time-series or pooled data), it is possible to derive some theoretical relationships between domestic savings and

foreign capital inflow. Within the framework of a simple theoretical model, this note has shown that the impact of foreign capital inflow on domestic savings—in terms both of sign and magnitude depends on the relative numerical values of a number of critical parameters : the marginal propensity to save the marginal productivity of local and foreign capital, the marginal rate of technical substitution between local and foreign capital, and the rate of profit which the owners of foreign capital take.

The real world-and a real economic system—is of course more complex than the model presented in this note. Hence, it is to be expected that more powerful theoretical models may help to arrive at more definite answers to the questions being raised in the controversy over the desirability or otherwise of foreign capital inflow into the less developed countries.

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Possibilities of Fertilizer Substitution for Land in Paddy Production

by

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The Problem

In India due to population growth the per capita net area sown has dropped from 0.30 hectares in 1960 to 0.25 hectares in 1970. Now, what avenues can ameliorate land scarcity? This scarcity may be mitigated partly through resource to technological progress in agriculture. Improved production techniques increase physical efficiency in resource use, i.e., increase output per unit of land input, thereby augmenting the effective supply of scarce land resource.

India commands about sixty per cent of the world acreage under paddy and produces hardly 12-15 quintals per hectare which is far below the average yield of paddy in Japan. This means that paddy production in India is mostly land oriented as it occupies nearly one third of the total area under food grains contributing only about forty per cent of the total production of foodgrains. Experimental results and varital cum-manurial trials on farmer's field have evidenced the significant response of paddy to the application of fertilizers. The empirical evidences available indicate that the expanded use of fertilizers offers large possibilities for increasing paddy production. Hence it may be hypothesised that fertilizers could be substituted for land such that a given level of paddy output can be produced with less land and more fertilizers. Khan & Heady [2], based on experimental production function for few locations in India studied marginal rates of substitution between fertilizer and land in production of wheat and paddy. They found that one ton of fertilizer nutrient replaced 101.55 acres and 33.58 acres of land in production of wheat and paddy at Bagwai and Tirukeppam respectively. It was also reported that the marginal rates of substitution between fertilizers and land depends upon the level of technology in different location.

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This main objective of this paper is to estimate and examine marginal rates of substitution of fertilizer for land and in Production of paddy at Jabalpur representing Rice-Wheat zone of Madhya Pradesh. The Annual precipitation in this region varies from 1200 m.m. to 1400 m.m. (90 per cent of which received during paddy season July-October).

Assumptions

The basic assumption made here is that the demand for chemical fertilizers has sufficiently been generated. Now, the farmers are in a position to substitute fertilizers for land to economise its use and to pacify themselves against the grievances of land-ceiling legislations. Finally, it is also assumed that the fertilizer supplies will not come in the way of its rational level of substitution for land.

Methods and Materials

Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur, Madhya Pradesh (India) develops technical know how for the state and is the main stream of the data required for the study. The data required were on crop responses to fertilizer¹ applications, input-output prices, area under paddy crop and varieties under irrigated and unirrigated conditions. The analysis is based on a huge body experimental data² available almost for a decade (1960-70). The fertilizer cum varietal trials conducted at Jabalpur provided the yield response data on paddy crop and varieties under irrigated and unirrigated conditions. Secondary data were obtained from the official publications of the Government of Madhya Pradesh.

The yield-dose relationship of paddy crop and varieties was established in the form of a quadratic model ($Y = a + bN - cN^2$) to estimate yield and profit maximising levels of nitrogen. Variety-wise response data were tested for homogeneity. In cases where homogeneity was found the aggregate production function (A) were obtained by pooling the data over years. In cases of heterogeneity, the composite production functions (C) were fitted from the yearly production functions by pooling and averaging regression coefficients over time using the inverse of the respective variances as weights. The fertilizer production functions thus obtained were transformed into land fertilizer production function [2,pp.32-34] (long run functions) where total output (Y) is a function of variable land (L) and fertilizer input (N).

¹ Fertilizer denotes fertilizer nutrient (Nitrogen).

² For High yielding varieties from 1965 to 1970 only.

$$Y = a + bN - cN^2 \quad \dots \quad (1)$$

Where,

Y = Total output,
and a,b,c, are regression coefficients.
N = Quantity of fertilizer,

The transformed land-fertilizer production function was obtained as

$$Y = aL + bN - cN^2 L^{-1} \quad \dots \quad (2)$$

The function in equation (2) has constant returns to scale for land and fertilizer which means doubling of both will double output. The isoquant equation is computed by solving equation (3)

$$L = \frac{Y - bN + (4acN^2 + (Y - bN)^2)^{1/5}}{2a} \quad \dots \quad (3)$$

Marginal rates of substitution (MRS) of fertilizer for land can be computed by taking the partial derivative of equation (2) with respect to N and L as shown in equation (4).

$$\text{MRS} \quad \frac{\partial L}{\partial N} = \frac{2cN L^{-1} - b}{a + cN^2 L^{-2}} \quad \dots \quad (4)$$

For estimating marginal rates of substitution, isoquant representing the optimum yield level (a + response to optimum level of N) was considered. Hectares of land replaced per ton of fertilizer nutrient at various combinations of land and fertilizer were worked out by multiplying MRS with 1,000 (one metric ton = 1,000 Kg.). The marginal rates of substitution are the "gross" marginal rates of substitution in the sense that the resources which compliment land and fertilizer are also involved in the substitution process.

Nitrogen was priced at the rate of Rs. 2.75 per kilogram while paddy prices used in this analysis were Rs. 50 and Rs. 45 per quintal of local and dwarf variety respectively.

Empirical Analysis

The crop equations fitted to the crop response to fertilizer use data for varietywise paddy crop are shown in Table I. There was a highly significant response to the application of nitrogen in all the varieties both under rainfed and irrigated conditions. Inter varietal responses varied widely. High Yielding Variety responded higher than their local counter parts. Irrigation resulted in to higher responses due to nitrogen

application in comparison to responses obtained under rainfed conditions. IR - 8 revealed significant year to year variations in yield due to its relatively poor adoptability to local conditions.

TABLE I
CROP EQUATIONS FOR JABALPUR ($Y = a + bN - cN^2$)

Crop/Variety	A/C	Coefficients of Crop Equations			R ²
		a	b	c	
Local (rainfed)	A	840.365	12.1178** (5.0084)	0.1035** (0.0038)	0.8102
Local (irrigated)	A	1270.720	19.2579** (7.5936)	0.0935* (0.351)	0.7483
Dwarf (IR-8) (irrigated)	C	1660.588	26.3631** (8.0534)	0.0565* (0.0243)	0.7604

(Standard errors are in parenthesis)

A = Aggregate production functions, C = Composite production functions.

** = Significant at 1% probability level. *Significant at 5% probability level.

Levels of Fertilizer

From the derived crop equations costs and returns to fertilizer at maximum levels of yield and profit for paddy crop were worked out and presented in Table II. The yield maximising levels of nitrogen varied widely among varieties ranging from 58.54 kilograms nitrogen per hectare in case of rainfed local varieties to 265 kilograms nitrogen per hectare for irrigated IR-8.

TABLE II
COSTS AND RETURNS TO FERTILIZER (N) AT MAXIMUM
LEVELS OF YIELD AND PROFIT—JABALPUR

[illegible]

Note : The official recommended doses of nitrogen per hectare for local varieties of paddy under rainfed condition are 12 kgs, while under irrigated conditions they are 20 kgs respectively. For dwarf paddy the recommended doses are 40 kgs nitrogen per hectare.

Conclusion

Paddy output is based largely on the magnitude of land input. The empirical estimates of the paddy responses and the rate and extent to which fertilizer serves as a technical substitute for land suggest that land input can be saved through less reclamation and greater fertilizer use on present land. In fact, the current output of paddy could be obtained through the use of more fertilizer and fewer hectares of land. The physical possibilities of substitution may not be realised unless the farmers are provided with information on fertilizer productivity and are given necessary incentives which may favour substitution of fertilizer for land.

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The Velocity of Money in Central America: Some Comments and Extensions

by

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AND

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In a recent issue of *The Bangladesh Economic Review*, Professors Wilford and Villasuso have analyzed the velocity of money in Central America [9, pp. 375-86]. The purpose of this comment is to clarify and extend their analysis. In particular, four problems will be dealt with: (1) their regressions using time as an independent variable do not contribute to explaining the behavior of velocity; (2) in their regressions using income as an independent variable, they do not adequately define what their measure of income is; (3) their use of the coefficient of variation as a measure of the relative stability of velocity is not appropriate; and (4) they do not pursue the issue of what explains intercountry similarities and differences in the behavior of velocity in Central America.

In Section III of their paper Wilford and Villasuso find that the velocity of money shows no consistent trend for the five Central American countries when money is narrowly defined to include only currency and demand deposits, but shows a consistent downward trend when money is broadly defined to include time and savings deposits as well as currency and demand deposits. In Section V they obtain essentially the same results with regressions using income instead of time as the independent variable, that is, rising income has the same impact as time on the velocity of money. Income is a significant explanatory variable for the same countries and definitions of money as time is, and the R^2 's and Durbin-Watson statistics are quite similar for the comparable regressions.¹ Since the behavior of velocity can be explained just as well by income, there is nothing to be gained by explaining velocity by a time trend which leaves unanswered the question of what causes this trend.

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¹ The regressions using income as the independent variable have higher R^2 's in seven of the ten instances, and the sum of the R^2 's is also higher for the income regressions.

There is a problem, however, with Wilford and Villasuso's regressions which use income as the independent variable, because they never state what their definition of income is. Since GNP is used to calculate velocity, one suspects that this is the measure of income used as the independent variable in their regressions, but this still leaves unanswered the question of whether it is nominal GNP or real GNP or perhaps even per capita GNP. Suppose, for example, that nominal GNP doubles; one would almost certainly have different expectations about the impact of such a change on velocity if it were produced by a doubling of the price level rather than by a doubling of real GNP. At the beginning of their paper, Wilford and Villasuso emphasize the monetary stability of the Central American countries, but even with this stability the average rates of increase in the consumer price index have ranged from 0.3 to 3.4 per cent per year for the five Central American countries over the period 1950-69, while the average growth rates in real GNP have ranged from 3.7 to 5.7 per cent per year.² Thus, changes in the price level have not been negligible relative to changes in real income, and in some of the Central American countries the increase in the consumer price index has been at least 50 per cent during the period under consideration.

In order to substantiate Wilford and Villasuso's regression results, the income velocity of money, with money narrowly and broadly defined, has been regressed alternatively on real GDP and nominal GDP.³ The results of these regressions are presented in Table I, with the period covered by the data indicated for each country. On the basis of the R^2 's and Durbin-Watson statistics in Table I, neither real nor nominal GDP clearly dominates the other as the explanatory variable for velocity. Because nominal GDP has risen more rapidly over time than real GDP, the coefficients for real GDP are larger in absolute value than the coefficients for nominal GDP in the comparable regressions, but the t-values do not differ appreciably. For velocity with money broadly defined, the results in Table I are generally quite similar to those of Wilford and Villasuso, although the Durbin-Watson statistics in Table I are consistently lower and reveal significant positive serial correlation of

² See Robert C. Vogel [7, p. 103].

³ Real GDP is nominal GDP deflated by the consumer price index. As previously indicated, money narrowly defined includes currency plus demand deposits, and money broadly defined includes currency plus demand deposits plus time and savings deposits. GDP is used as the numerator in calculating velocity. All data are from *International Financial Statistics*.

TABLE I
INCOME VELOCITY OF MONEY AS A FUNCTION OF NOMINAL
GDP (Y_n) AND REAL GDP (Y_r): REGRESSIONS FOR FIVE
CENTRAL AMERICAN COUNTRIES

Velocity with Money Narrowly Defined (V_1) :								
Country	Period	Intercept	Independent Variable			R^2	S_e	D.W
Costa Rica	1950-72	6.96	-.00023**	(5.0)	Y_n	.55	.384	1.03
		7.23	-.00031**	(4.7)	Y_r	.51	.399	.96
El Salvador	1958-73	7.58	.00017	(0.5)	Y_n	.02	.731	.66
		7.20	.00037	(0.9)	Y_r	.06	.716	.68
Guatemala	1950-73	9.87	.00023	(0.7)	Y_n	.02	.750	.58
		9.76	.00032	(0.9)	Y_r	.03	.747	.59
Honduras	1950-72	12.24	-.00177**	(2.6)	Y_n	.24	1.119	.55
		12.71	-.00237*	(2.2)	Y_r	.18	1.157	.54
Nicaragua	1953-73	8.89	-.00003	(0.2)	Y_n	.00	.943	.71
	1953-69	8.58	.00007	(0.3)	Y_r	.01	.782	.57
Velocity with Money Broadly Defined (V_2) :								
Costa Rica	1950-72	6.21	-.00033**	(9.3)	Y_n	.80	.300	1.28
		6.63	-.00046**	(8.7)	Y_r	.78	.316	1.17
El Salvador	1953-73	7.23	-.00123**	(9.1)	Y_n	.86	.306	1.27
		7.77	-.00157**	(10.3)	Y_r	.88	.274	1.48
Guatemala	1950-73	11.09	-.00310**	(11.6)	Y_n	.86	.656	.74
		11.92	-.00384**	(14.0)	Y_r	.90	.556	.69
Honduras	1950-72	12.47	-.00516**	(11.5)	Y_n	.86	.726	.94
		14.52	-.00766**	(10.0)	Y_r	.83	.814	.86
Nicaragua	1953-73	9.66	-.00064**	(8.7)	Y_n	.80	.579	.66
	1953-69	10.22	-.00087**	(5.4)	Y_r	.66	.552	.70

Note : Velocity with money narrowly defined (V_1) is GDP divided by currency plus demand deposits ; velocity with money broadly defined (V_2) is GDP divided by currency plus demand deposits plus time and savings deposits. Real GDP (Y_r) is nominal GDP (Y_n) deflated by the consumer price index. All data are from *International Financial Statistics*. The t-values are given in parentheses next to each coefficient ; and those marked by one asterisk (*) are significant at the 5 per cent level, and those marked by two asterisks (**) at the 1 per cent level. R^2 is the multiple correlation coefficient ; S_e is the standard error of estimate ; D.W. is the Durbin-Watson statistic.

residuals for most of the Central American countries.⁴ For velocity with money narrowly defined, there is one minor difference between the results in Table I and those of Wilford and Villasuso: the explanatory power for Costa Rica is now greater than that for Honduras. However, there is also a major difference: Wilford and Villasuso find that for El Salvador income has a significant positive impact on velocity with money narrowly defined, but, there is no such relationship present in Table I. Since the data used in the present study cover an appreciably longer period of time for El Salvador (1958-73, rather than 1958-70), this difference, as well as the other discrepancies, may be attributable to differences in the data.

The most serious problem with the findings of Wilford and Villasuso is in Section IV concerning the variability of velocity. They use the coefficient of variation to measure the relative variability of velocity and conclude that "Central American velocity appears to be more stable when money is defined as currency plus demand deposits than when the broad definition of money (M_2) is used". However, this results from the fact (found by Wilford and Villasuso and confirmed in this paper) that velocity has fallen significantly over time with the rise in GDP when money is broadly defined, while the impact of GDP on velocity has been much smaller and less consistent when money is narrowly defined. To compare the stability of two series, when one has a strong trend and the other does not, it is clearly inappropriate to use the coefficient of variation. The appropriate measure is the variability around whatever trend exists, or in the present case the variability in the velocity series which is not explained by GDP. The standard error of estimate for each regression in Table I divided by the mean of the corresponding velocity series provides such a measure of relative stability.⁵

For each of the five Central American countries and for money both narrowly and broadly defined, Table II presents the average velocity of money, the coefficient of variation of velocity, and the standard error of estimate from each regression in Table I divided by the mean of the corresponding velocity series.⁶ From the results in Table II it can be seen that the findings of Wilford and Villasuso are completely

⁴ The presence of significant serial correlation of residuals is not surprising because of the exclusion from the analysis of such explanatory variables as interest rates. To test whether serial correlation might be due in part to mis-specification of the functional form, the regressions in Table I were also run in logarithmic form, but this failed to improve either the explanatory power or the Durbin-Watson statistics.

⁵ This same point is made by Park [10, p. 628]; interestingly, Wilford and Villasuso quote Park [10, p. 624] in their discussion of the variability of velocity.

⁶ For each velocity series there are two regressions in Table I, one in which nominal GDP is the independent variable, and one in which real GDP is the independent variable; both standard errors of estimate for each velocity series are used in Table II.

altered. When the standard error of estimate divided by the mean is used to measure relative variability, velocity with money narrowly defined is no longer more stable; if anything, it is velocity with money broadly defined which tends to be more stable. In addition, the tendency for countries with higher velocities to have relatively less stable velocities is much less clear when the comparison is appropriately made on the basis of the standard error of estimate divided by the mean rather than on the basis of the coefficient of variation.

Wilford and Villasuso raise some issues in Sections I and II of their paper which they do not pursue. For example, they mention that Melitz and Correa [3,pp.12-17] suggest that international differences in velocity may be explained by interest rates, ratios of currency to money, and degrees of monetization. Wilford and Villasuso go on to state that adequate data on interest rates and degrees of monetization are not available for the Central American countries, so that this issue must await future research. However, there clearly are adequate data on the ratios of currency to money, and there is also information available which can be used to make inferences about degrees of monetization, even though Goldsmith [5,pp.27-30] places all the Central American countries (except El Salvador which is not classified) in his group C, less than 65 per cent monetized. It has often been suggested that the degree of monetization is related to the relative size of the agricultural sector or to the proportion of the population living in rural areas, and data such as these are available for the Central American countries. In addition, it has often been suggested that real GDP per capita will affect velocity.

When the average income velocities given in Table II are compared with the ratio of currency to money, the per cent of GDP originating in the agricultural sector, the proportion of the population living in rural areas, and real GDP per capita for each of the five Central American countries, certain patterns do emerge.⁷ Costa Rica, which has the lowest velocity, has the highest real GDP per capita, the lowest ratio of currency to money, and the lowest per cent of GDP originating in agriculture, although both El Salvador and Nicaragua have smaller proportions of

⁷ The data for these variables are from the U.N. *Statistical Yearbook*, except the data for the ratio of currency to money, which are from *International Financial Statistics*. For each variable, either an average for the period under consideration or a figure from the middle of the period has been used.

their populations living in rural areas.⁸ Honduras, which has the highest velocity, has the lowest real GDP per capita, the highest per cent of GDP originating in agriculture, and the highest proportion of its population living in rural areas, although Guatemala has a higher ratio of currency to money. However, El Salvador, with its low velocity, cannot readily be distinguished from Nicaragua and Guatemala (both of which have much higher velocities) on the basis of real GDP per capita, the per cent of GDP originating in agriculture, the proportion of the population living in rural areas, or the ratio of currency to money. Thus it has not been possible to find one particular variable which correlates perfectly with velocity in ranking the five Central American countries, nor to separate the individual influence of each of these variables on velocity. However, some patterns do emerge, so that one should not be as quick as Wilford and Villasuso to consign intercountry differences in velocity to the realm of future research.⁹

Another issue which Wilford and Villasuso do not pursue arises from the suggestion at the beginning of their paper that it is appropriate to examine the five Central American countries as a group because of their relative monetary stability and because of their membership in the Central American Common Market. Thus it seems appropriate to enquire to what extent velocity has behaved similarly in the five Central American countries, and one approach to this question is to correlate the velocity series for each pair of countries. The result for velocity with money narrowly defined is that as many of the correlation coefficients are negative as positive, and very few of the coefficients are statistically significant even at the 10 per cent level. For velocity with money broadly defined, all the correlation coefficients are positive and significant at the 1 per cent level, but this is due again to the common downward

⁸ As reported in Table II, for money broadly defined, El Salvador has a somewhat lower velocity than Costa Rica, but this is misleading because the data for Costa Rica cover 1950 through 1972, while the data for El Salvador cover only 1958 through 1973, and velocity with money broadly defined has a significant downward trend. Even taking this into account, velocity is still appreciably lower in El Salvador than in the other three Central American countries.

⁹ Hanson and Vogel [4, pp. 368-370] point out some of the problems in discovering what causes intercountry differences in velocity, as well as indicating the importance of this issue.

TABLE II

**AVERAGE INCOME VELOCITY OF MONEY AND THE VARIABILITY
OF VELOCITY IN FIVE CENTRAL AMERICAN COUNTRIES
WITH MONEY NARROWLY DEFINED (V_1) AND MONEY
BROADLY DEFINED (V_2)**

Country	Period	Average		Coefficient of Variation		Standard Error of Estimate			
		V_1	V_2	V_1	V_2	Mean			
				V_1	V_2	$V_1 : Y_n$	$V_1 : Y_r$	$V_2 : Y_n$	$V_2 : Y_r$
Costa Rica	1950-72	6.16	5.06	.090	.131	.062	.065	.059	.062
El Salvador	1958-73	7.94	4.68	.090	.166	.092	.090	.965	.059
Guatemala	1950-73	10.16	7.20	.073	.238	.074	.074	.091	.077
Honduras	1950-72	10.64	7.82	.116	.245	.105	.109	.093	.104
Nicaragua	1953-73	8.79	7.19	.105	.175	.107	.089	.081	.077

Note: Velocity with money narrowly defined (V_1) is GDP divided by currency plus demand deposits; velocity with money broadly defined (V_2) is GDP divided by currency plus demand deposits plus time and savings deposits. All data are from *International Financial Statistics*. The standard error of estimate is taken from the regressions in Table I explaining V_1 and V_2 where Y_n indicates that explanatory variable is nominal GDP and Y_r that the explanatory variable is real GDP.

trend in velocity with money broadly defined in all five Central American countries. An alternative measure, which tests for similarities in the behavior of velocity after this trend has been removed, is the correlation for each pair of countries of the residuals from the regressions in Table I, and this measure reveals no significant similarities among countries. There may be good reasons for considering the Central American countries as a group, but this cannot be based on similarities in the behavior of velocity, except for the common downward trend in velocity with money broadly defined in response to increasing GDP.

There is, however, one pattern which has not yet been mentioned—velocity with money broadly defined has been converging in the five Central American countries. This convergence is indicated by the negative coefficients for GDP in the regressions in Table I, which tend to be larger for the countries with higher velocities, and can be confirmed by comparing the intercountry differences in velocity in the early 1950's with those in the late 1960's and early 1970's. On the other hand, this pattern of convergence does not exist for velocity with money narrowly defined. Thus, the growth in time and savings deposits relative to GDP has not only been greater in the countries with higher velocities, but

this growth has also been sufficiently great to counter-balance the fact that currency and demand deposits have not tended to grow relatively rapidly. It seems puzzling that the monetary system in its role as a financial intermediary is tending to reach the same importance relative to GDP in all five Central American countries, while there is no such tendency for monetization (narrowly defined to include only currency and demand deposits) to proceed to the same extent in all the countries. This pattern may be related to the fact that interest is paid on time and savings deposits but not on holdings of currency and demand deposits. Such a pattern may also have significant implications for the impact of financial growth on capital formation and economic development, as suggested by the new theories of Shaw [1] and McKinnon [6].

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Sharecropping and Economic Efficiency in Bangladesh—Comment

by

M. A. JABBAR*

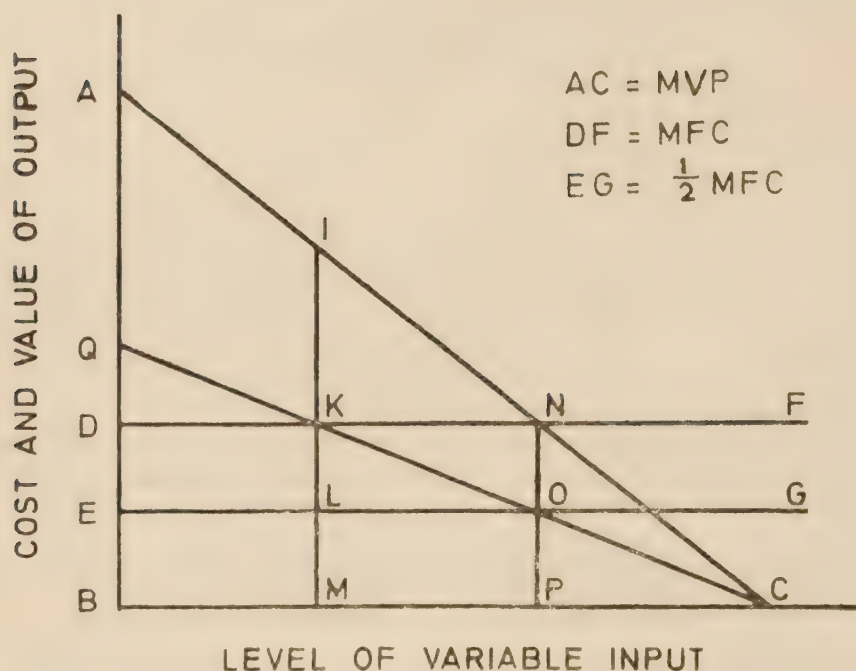
Sharecropping and its counterpart absentee ownership have generally been considered inefficient in theoretical and empirical economic literature. Zaman [9] took exception to this general contention with reference to Bangladesh agriculture. He tried to argue with empirical support that within the given context of Bangladesh the traditional marginality principles of western market economy to measure efficiency were not applicable and that sharecropping as an institution was not only efficient but socially desirable for the 'achievement of maximum aggregate economic gains'.

The purpose of this note is to point out some of the shortcomings of Zaman's data and argument.

Zaman suggested that the optimality conditions explained by Figure 1 were valid for such input as labour in a full employment situation and under conditions of perfect competition which was not the case in Bangladesh. He argued that labour was the main variable input of agricultural production in Bangladesh with almost zero marginal variable cost because of lack of employment opportunities (this he considered equally true for owner operators and sharecroppers). Therefore, farmers employ labour upto the limit imposed by the production possibility curve (AC) and production under sharecropping will not necessarily be less than production under owner cultivation. He further argued that if the landowner were to cultivate the land himself, he has to hire labour and he will hire labour at the market wage rate upto BP. If the land is given on sharecropping basis, the tenant will use his labour upto BC because his opportunity cost is zero. Total output will be greater in case of the latter and the society as a whole will be gainer.

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FIGURE 1



He suggested that his empirical data from two different areas of Bangladesh did not provide any conclusive proof of significant yield differences in the owner operated and sharecropped land. His results also suggested that sharecropping arrangement as such did not prevent the acceptance of modern inputs and that landowners and sharecroppers often shared the costs of such modern inputs in the same production as output was shared between them. So, sharecropping could be considered efficient on the basis of both static and dynamic efficiency criteria.

The shortcomings of his data and argument are as follows :

(1) The assumption of (family) labour as a variable input is untenable in the short-run analysis which he used. In the short-run the supply of labour is fixed in the same sense as land or capital is although the amount of labour time actually used (or can be actually used) may be variable.

(2) His argument and interpretation would be applicable for a pure tenant who has no land but own other resources and a landowner who has only land but not other resources. In this case, if either is to maximize his own returns with resources fixed in quantity, he must seek out resources of the other until the marginal value productivity of the latter resources become zero [4]. In reality, such an equality is unlikely to be achieved and the relative earnings of the owner and the tenant will depend on their strength in the market which is imperfect.

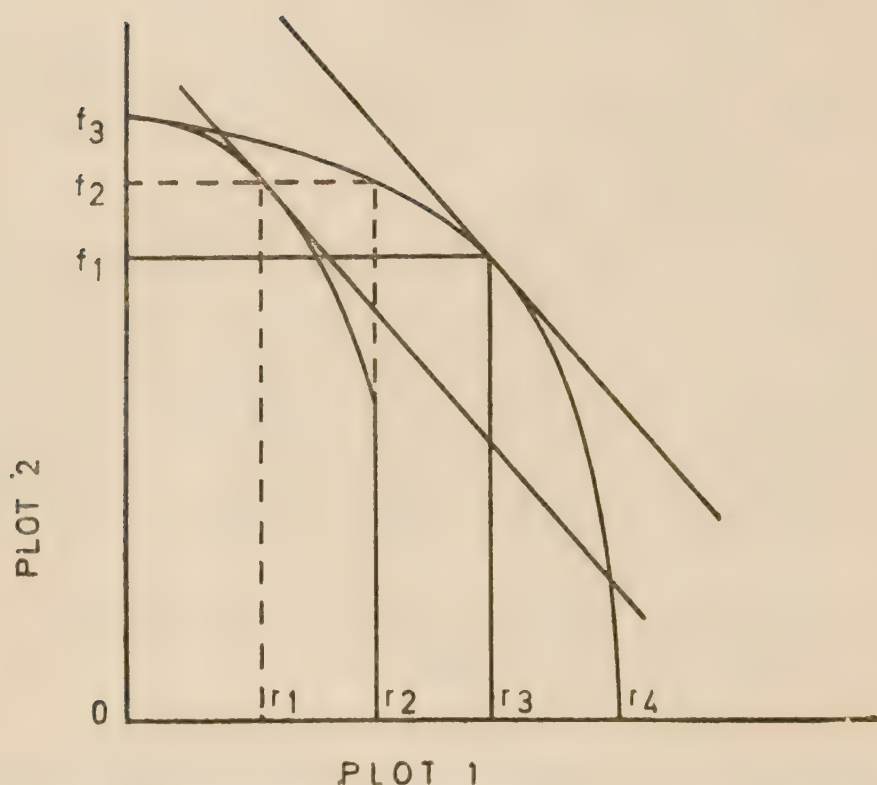
(3) He has not shown any positive proof that the level of labour use on the owned and share rented land on the tenant farm (because his sample consisted of farms who owned some land and rented additional land to make use of other resources) were in fact the same. He has only shown the differences in average yields between owner and part-tenant farms but he has not shown the yield difference between owned and rented land on the part-tenant farms. Since by his own account, it is quite likely when a farmer rents land to another on the cropsharing basis he will rent out those lands which are less fertile than those he will keep for himself [9,p. 155], it is also likely that yields will differ between owned and rented land on the part-tenant farm.

The allocative decision of a part-tenant can be considered as one of product-product relationship i.e., product from his own land against product from rented land by using the same stock of other resources. This can be explained by Figure 2.

If it is assumed that both the plots of land belong to an owner operator or a cash tenant, then the decision making production possibility curve will be $f_3 r_4$. Under perfect competition product price is the same for owned and rented land, so ER represents the isorevenue curve. The profit, maximizing output combination for the owner or the cash tenant will be of_1 from plot 1 and or_3 from plot 2.

If it is now assumed that plot 1 is owned by the farmer himself and plot 2 is rented on half-cropsharing arrangement with no sharing of variable input, then the relevant production opportunity curve for the part-tenant will be $f_3 r_2$ because he realises full product from his own land but only half of the product from the rented land. Given the same isorevenue curve as before, the profit maximizing output combination for the part-tenant will be of_2 from his own land and or_2 from rented land of which or_2 will be his share. It, therefore, appears that a part-tenant will produce a relatively greater output from his own land ($of_2 < of_1$)

FIGURE 2



and a smaller output from the rented land ($or_2 < or_3$). (the is so under the assumption of no differences in fertility between the two plots.) As long as $(of_1 + or_3) = (of_2 + or_2)$, resource allocation may not be inefficient from the point of view of the society. But this is possible only under the condition of perfect competition. Under the prevailing imperfect conditions in Bangladesh, as suggested by Zaman, it is more likely that the tenant will try to produce even higher output than the optimum from his own land but less so from the rented land. In terms of Figure 1, he will use BP or more amount of labour on his own land but BM or slightly greater than BM but less than BP amount of labour on the rented land.

(4) The assumption of zero or near zero opportunity cost of labour is also untenable (in an optimistic sense) because, by his own account the workers could easily sell BP amount of labour and other resources

at the market rate if the landowner would decide to cultivate himself. The argument that part-owners do not go on looking for jobs or work on somebody else's land because of rare opportunities for such work would also be untenable if the landowner would decide to cultivate himself. Such argument also seems to be superfluous when one considers the larger number of landless workers and near landless tenants for whom work means survival. The landowner's decision to rent out land rather than cultivate himself should be explained not by this apparent unavailability of labour but by the economic advantage of such operation which is working in his favour. As one author put it, the normal tendency in overpopulated countries is for the great landowners to let their lands to the peasants for rent, rather than to hire agricultural labourers. They get more this way, since the wage they would have to pay to labourers is more than is left to the peasants when rents have been extracted from them [8,p.326]. In the same way, he does not normally intend to come to an ideal leasing arrangement because the possible advantage of an ideal lease to the tenant may be higher than it is for the owner.

(5) There is evidence to suggest that cost sharing and adoption of improved technology is not as common as Zaman has suggested [6].

(6) Even if sharecropping is efficient by the above measures, it does not follow that it should be specially desirable. All traditional leasing arrangements are exploitative in nature. Several specific elements of tenant exploitation are mentioned in economic literature which may be observed in Bangladesh as elsewhere :

- (a) If share tenants have free access to land they will rent additional land until its marginal value product is zero. Land owners do not allow tenants to take such advantage by restricting the amount of land leased to individual tenant and by changing the tenants very often.
- (b) Under certain circumstances the landowner may be able to force the tenant to employ more than BM amount of labour on the rented land (Figure 1) under different contractual arrangements, for example, supply of labour at fixed wage when actual wage is higher, unpaid help in somekind of household work etc.
- (c) If the tenant families are producing a less than minimum subsistence level of output, then the landowner may force the tenant to use his labour beyond BM level to earn at least the subsistence minimum. The same can happen if the rental share goes up against the tenant.

- (d) Under dynamic technological conditions wages may increase due to increased demand for labour, as Zaman has suggested, but the amount of exploitation will also increase, even when cost is shared, because the increased output is a result not only of fertilizer and seeds whose costs may be shared but also of other resources including labour owned by the tenant.
- (e) Zaman himself has mentioned the special credit problems faced by the tenants because of their inadequate abilities to provide securities required for institutional credit. Consequently they dependent on their landowners for borrowing at very high rates of interest.

As a result of all these, landowners earn more than their specific contribution to output while actual producers receive much less. To argue that the marginality conditions of western market economy are not applicable in the prevailing situation of Bangladesh is one thing but to regard the prevailing system as efficient and socially desirable is another. It amounts to saying that "an overpopulated economy does not operate efficiently unless some labourers earn more than their own contribution to output" [3,p.31]. It appears as though the rules which would govern the efficiency and social desirability of a system should be biased towards a small number of landowners against mass of tenants and agricultural workers. A remarkable commendation for social justice indeed.

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REVUE TIERS - MONDE

Tome XVI n° 61, Janvier-mars 1975

ORGANISATION DE L'ESPACE

Les activités tertiaires supérieures dans les pays d'économie dominée
sous la direction de Michel ROCHEFORT

Note de la Rédaction : Ce numéro est le troisième de la Revue Tiers-Monde entièrement consacré à la détermination des mécanismes actuels d'organisation spatiale dans les pays d'économie dominée. Dans le n° 45, "La Ville", on étudiait les facteurs de la concentration urbaine et les modifications apportées par l'urbanisation à l'ensemble de la vie économique, sociale et culturelle. Dans le n° 50, "Modernisations et espaces dérivés", on a voulu fournir un instrument méthodologique d'analyse permettant de dégager les différents types d'organisation spatiale dans les pays sous développés. Cette étude a montré l'impact des forces externes, à chaque période de développement du système capitaliste dans les pôles, sur les éléments des systèmes internes des pays dominés. Dans le n° 61, développement du système capitaliste dans les pôles, sur les éléments des systèmes on s'interroge sur le rôle des activités tertiaires supérieures dans les phénomènes de domination ; on tente de préciser par quels mécanismes elles interviennent dans les relations inégales entre les pays industriels et les pays d'économie dominée et quel rôle elles jouent dans l'organisation de l'espace de ces derniers.

Avant-propos par Michel ROCHEFORT.

M.-C. GUERRINI, H. LAMICO, C. PAIX, M. ROCHEFORT : Formes de domination, activités tertiaires supérieures et organisation de l'espace,

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Le secteur tertiaire des pays d'économie dominée.

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REVUE TIERS - MONDE
Tome XV, n° 59-60, Juillet-decembre 1974
EDUCATION ET DEVELOPPEMENT
L'école et le Tiers-Monde en 1974

Note de la Rédaction : Après les études précédentes sur la planification de l'éducation, son financement, ses rapports avec l'emploi et le développement, les effets sociologiques des politiques d'éducation, ce sixième numéro de la Revue Tiers-Monde consacre aux problèmes d'éducation rend compte des interrogations sans cesse plus nombreuses que pose le développement de l'école, institution aujourd'hui critiquée et décriée dans les pays industrialisés. Ce discrédit revêt dans les pays du Tiers-Monde des formes particulières qui vont jusqu'à prôner l'arrêt de la scolarisation par de nombreuses instances. Pourtant l'application de diverses techniques de planification et les réflexions suscitées par les résultats de ces dernières années, dont on trouvera des échos dans les différents articles, montrent que l'on voit poindre aujourd'hui l'ébauche de nouveaux espoirs ou les responsabilités nationales affrontent les inevitables difficultés avec moins de romantisme et davantage de lucidité.

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The Bangladesh Development Studies

Volume III

July 1975

Number 3

- 261 Some Aspects of Bangladesh Agriculture : Review of Performance and Evaluation of Policies

Mohiuddin Alamgir

- 301 Farm Size, Efficiency and the Socioeconomics of Land Distribution

Md. Anisur Rahman

- 319 Income Inequality and Land Redistribution in Morocco

Keith B. Griffin

- 349 Microregion, Market Area and Muslim Community in Rural Bangladesh

Peter J. Bertocci

- 367 Development Strategy in the Poor Countries

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Some Aspects of Bangladesh Agriculture : Review of Performance and Evaluation of Policies

by

MOHIUDDIN ALAMGIR*

I. INTRODUCTION

The major problems encountered by the agriculture sector of Bangladesh are not uncommon to developing countries of Asia and Africa. Table I presents a view of the Bangladesh agriculture within the perspective of the prevailing situation in selected countries of Asia and Africa.

(a) An overwhelmingly large proportion of population depend on agriculture as the main source of livelihood. Both this and the proportion living in rural areas are comparable with some of the poorest countries in Asia and Africa.

(b) Agriculture sector has continued to account for a significant proportion of GDP and the importance of agriculture has increased in recent years due to a fall in non-agricultural output. In this respect Bangladesh compares unfavourably with many countries of Asia and Africa.

(c) Dependence on agriculture is more sharply focussed when one considers the fact that one single crop (rice) predominates the agricultural scene.

(d) Bangladesh agriculture is characterised by primitive technology. In the productivity scale Bangladesh ranks very low compared with other developing countries in Asia and Africa. This will be true no matter whether one makes such comparison on the basis of yield per acre of different crops or total value added per capita in agriculture. The new seed-fertilizer-irrigation technology has not made any significant impact on Bangladesh agriculture. On the whole it is observed that during the last two decades the overall rate of growth of agricultural output never exceeded the rate of growth of population.

(e) Land-man ratio is one of the most unfavourable for Bangladesh in the developing world as is reflected in a very small average size of holding. This

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TABLE I
SOME COMPARATIVE STATISTICS FOR SELECTED COUNTRIES IN ASIA AND AFRICA

Country	Total Popula- tion (million) Mid- 1972	Rural Popula- tion as % of Total Popula- tion	Agril. Lab. Force as % of Total Labour Force	Per Capita Agril. Land (acre)	Per Capita G.N.P. (1971) U.S. \$	% of G.D.P. Originating in Agril. Forestry & Fishing	Ratio of Gross Cropped Area in Major Crop to Total Net Cropped Area	Yield per Acre of Paddy (lbs.)	Index of Per Capita Food Prodn. in 1972 (1961- 65=100)	Gini Concen- tration Ratio for Rural Income	People below Poverty Line in Rural Areas	
											%	No. in Millions
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(12)
Bangladesh	74.00	88.0	70.5	0.40	62	61	72	1335	77	0.44 ^b	94 ^b	64
India	562.99	80.2	67.7	1.09	94	47	40	1438	97	0.29 ^c	53 ^c	218
Pakistan	62.52	77.5 ^a	70.5	5.87 ^a	82	36	n.a.	2014	112	0.26 ^d	26 ^d	12
Sri Lanka	13.22	81.9	52.3	0.74	176	35	90	1951	92	0.45 ^e	n.a.	n.a.
Thailand	38.61	81.8	76.5	1.02	189	32	89	1615	95	0.38 ^f	47 ^f	18
Philippines	40.69	70.1	69.5	0.82	279	28	54	1329	98	0.43 ^g	n.a.	n.a.
Indonesia	120.75	88.4	70.0	0.53	109	54	82	2222	100	n.a.	n.a.	n.a.
Cameroon	5.78	79.7	81.8	3.76	166	50	42	741	114	n.a.	n.a.	n.a.
Ethiopia	25.25	91.6	84.6	1.48	75	53	40	n.a.	109	n.a.	n.a.	n.a.
Kenya	11.67	90.4	80.4	1.47	137	35	68	3815	105	n.a.	n.a.	n.a.
Malawi	4.55	95.0	87.5	1.85	84	57	88	1008	122	n.a.	n.a.	n.a.
Mali	5.12	88.8	91.1	6.39	70	n.a.	88	785	85	n.a.	n.a.	n.a.
Nigeria	56.51	83.9	67.0	1.18	140	52	n.a.	1526	86	n.a.	n.a.	n.a.
Tanzania	13.21	94.5	85.9	2.53	97	39	56	1063	140	n.a.	n.a.	n.a.

n.a. Indicates not available.

(a) 1961 census. (b) 1973/74. (c) 1967/68. (d) 1969/70. (e) 1952/53. (f) 1968/69. (g) 1965.

Sources : Columns 1, 3, 4, 5, 6, 7, 8—[37, P. 379 ; 62, pp. 14, 19-23].

Column 2—[60, p. 136].

Column 5—[37 ; 60, p. 3].

Columns 10, 11, 12—[12].

coupled with low productivity and low cropping intensity explains adequately the poor performance of agriculture on both total and per capita basis. Crisis in agriculture is further compounded by the continuous subdivision and fragmentation of landholding. Although not sufficient data are available, yet it is an accepted fact that per capita (or household) availability of other agricultural resources (mainly of productive assets) is very low.

(f) While owner-farming predominates the farm structure in Bangladesh, there is tremendous inequality in the ownership of landholding. Although the institution of share-cropping and tenancy have some equalising effect as reflected in the degree of inequality measured by operational holding or by income, yet the basic pattern set by ownership of agricultural assets, particularly land continues to shape the destiny of the agricultural population.

(g) The organisation of agriculture in Bangladesh is characterised by elements of feudalism, semi-feudalism and capitalism. At its present state, it seems that the prevalence of these patterns of production relations in one form or another is working towards a low growth potential and also an inequitable distribution of income. These forces are further reinforced by the power structure both at the village and the national level as well as by the kinship and factional relationships dominating the village society.

(h) The above have culminated in the existence of mass poverty among the agricultural and the rural population of Bangladesh. For a large proportion of population levels (absolute) of wages, employment and real income are very low so much so that it does not meet an objectively defined criterion of minimum living standard. More importantly, the rural poor seem to have been caught in what may be called the "Below Poverty Level Equilibrium Trap". Admittedly, the spectre of poverty and famine is present today across many countries of Asia and Africa but the situation of Bangladesh appears to be the most precarious.

With the above background, the purpose of this paper is to highlight the basic characteristics of the Bangladesh agriculture as they have developed over the past years and evaluate the role of policies adopted by the political and administrative authorities in order to tackle the problems of agricultural development. Section II will contain structural analysis of the agriculture sector of Bangladesh. This will be followed by an evaluation of policies and institutions in Section III. Some concluding remarks will be presented in Section IV.

II. AGRICULTURE SECTOR IN BANGLADESH

Physical Condition and Natural Constraints

Bangladesh has a land area of about 35.5 million acres, of which cultivable area is 22.5 million acres. Allowing for an average cropping intensity of about

143% the total cropped area comes to about 31.2 million acres.¹ About 80% of Bangladesh is composed of recent alluvium soils and the rest is divided equally between old alluvium soils and rocks [26,p. B II-2]. Besides different regions of the country are subjected to different degree of flooding every year depending on the amount of rainfall and water discharged through the major streams and water ways. According to the available survey data of UNDP/FAO, 27% of the cultivated area are flooded upto 1 foot, followed by 40% between 1-3 feet, 18% between 3-6 feet and 15% above 6 feet.²

About two-thirds of the cultivated area fall within intermediate and highlands suitable for irrigation development and no substantial investment is needed for flood control. The strategy proposed in the First Five Year Plan [33, pp. 142-53] of Bangladesh is that in the short run emphasis will be placed on the development of low cost, labour intensive and quick yielding irrigation programmes while in the long run a more balanced water resource development could be pursued which will incorporate large scale flood protection and drainage schemes. However, some minor flood protection schemes have already been implemented and some are underway but new ones will be undertaken only if it makes available a substantial area for crop production during the flood season without committing an unduly large proportion of investible resource.³

The existing irrigation schemes include the use of low-lift pumps, deep and shallow tubewells and large scale canal irrigation. However, as of June 1973 only about 1.4 million acres or less than 5% of the gross cropped area has been brought under irrigation. The modest programmes of irrigation so far taken up have been beset with many problems. On the one hand, the facilities created are not being efficiently utilized, and on the other hand, the benefit flowing from these are not being equitably distributed. For example, the Ganges Kobadak project which is a large scale irrigation (gravity) project has, due to a number of technical and structural problems, been able to provide dry season irrigation to only 10,000 acres. On the other hand, the low lift pumps fielded through the Agricultural Development Corporation, are characterised by a very low rate of capacity utilization, the average rate in one study having been found to be 25% only [7]. Besides, the distribution of pump sets seems to have followed closely the local political power and patronage lineage. The major problem is not the availability of pumps alone but their availability in time, along with assured supply of fuel, spares and repair facilities. Given the farm structure in Bangladesh, efficient utilisation of these pumps

¹These figures relate to 1971/72 and are quoted from [32 pp. 46-47].

²See [41, p. 4]. Percentages are recalculated excluding area under settlement and water.

³The Bangladesh Water Development Board (BWDB), the agency responsible for implementing flood control projects, has so far been able to protect about 3 million acres fully and one million acres partially from floods [33, p. 153].

(e.g., 2 cusec pump with an average command area of about 100 acres) requires formation of groups by farmers. These groups are dominated by large farmers and either a disproportionately greater use of this facility is made by them or they manage to extract a high rental from smaller farmers using the pump water. Similar phenomenon is also observed in many areas around deep and shallow tubewells.⁴

Land Use Pattern and Growth of Agriculture Sector

The importance of crop production and in particular of rice in Bangladesh agriculture can be seen from the composition of agricultural value added (Table II).

TABLE II
COMPOSITION OF AGRICULTURAL VALUE ADDED, 1969/70

(CURRENT PRICES)	
1. Rice	63
2. Jute	6
3. Tea	1
4. Other Crops	12
5. Forestry	2
6. Fisheries	9
7. Livestock	7
Total	100

Source : [42, Table III 93].

There has not been any significant change in the net cropped area over the years in Bangladesh but due to increase in cropping intensity gross cropped area increased from 25.91 million acres during 1954/55-1959/60 to 30.3 million acres in 1973/74. During the same period cropping intensity increased from a low level of around 120% to about 150%. A significant increase in cropping intensity was recorded during mid-1960's when HYV rice (IR-8) was introduced. Furthermore a close relationship has been found to exist between population density and cropping intensity [42, p. ii] which also leads one to speculate that other things remaining the same intensity is higher in smaller farms as compared with larger farms.⁵

Overall cropping pattern and its variation overtime is brought out clearly in Table III. Relative importance of the different crops seem to have remained the

⁴No thorough investigation of this aspect of the problem has been carried out in Bangladesh. But some observations along this line can be found in, Abdullah, A., Hossain, M. and Nations, R. [4].

⁵This is quite expected in view of the subsistence requirement of small farming families. For some evidence on this see, Asaduzzaman, M.[15, p. 30].

same over the years except that there was slight increase in the share of rice area while that of oilseeds and other crops declined. Jute registered a fall in the late 1950's as compared with the late 1940's which is indicative of the continuation of post Korean War slump. However, it picked up again in the late 1960,s but there was a compensatory fall in the productivity (yield) of jute land.

TABLE III
BANGLADESH : CROPPING PATTERNS

Crops	1946/47 to 1949/50 Area (million acres)	%	1955/56 to 1959/60 Area (million acres)	%	1965/66 to 1969/70 Area (million acres)	%	1973/74 Area (million acres)	%
Rice	19.3	75.3	20.1	77.6	23.9	77.6	24.4	80.4
Aus	4.8	18.8	5.8	22.4	7.9	25.0	7.7	25.3
Aman	13.7	53.5	13.5	52.1	14.5	47.1	14.1	46.6
Boro	0.8	3.1	0.8	3.1	1.7	5.5	2.6	8.6
Jute	1.8	7.0	1.5	5.8	2.3	7.5	2.2	7.2
Wheat	0.09	0.4	0.1	0.4	0.2	0.7	0.3	1.1
Potatoes			0.08	0.3	0.2	0.7	0.2	0.7
Sugarcane	0.2	0.8	0.3	1.2	0.4	1.4	0.4	1.2
Tea	0.07	0.3	0.08	0.3	0.1	0.3	0.1	0.4
Tobacco	0.1	0.4	0.1	0.4	0.1	0.3	0.1	0.4
Oilseeds	0.7	2.7	0.8	3.1	0.8	2.6	0.6	2.2
Others	3.5	13.0	3.1	10.8	3.1	9.1	2.0	6.4
Total	25.6	100.0	25.9	100.0	30.8	100.0	30.3	100.0

Source : [31; 32] and The Bureau of Agricultural Statistics, Government of Bangladesh.

During the period 1949/50 to 1959/60 value added in agriculture registered a growth rate of only 1.5% per annum and the corresponding parametric rate of growth (estimated from a semilogarithmic trend function) was 0.66%, both of which were much below the rate of growth of population (3%).

In relation to the population growth a similar picture emerges during 1959/60—1969/70, although both the implicit (3.0%) and the parametric (2.93%) growth rates are higher than those achieved during the earlier period [14, pp. 38-48]. Situation in the period following 1969/70 has been very depressing when the dislocation of the liberation war caused a 17% fall between 1969/70 and 1972/73 in the value added from the agriculture sector at 1969/70 factor cost [8, p. 96]. It is important to note that of the different possibilities, a linear function seems to be the

appropriate growth model for the Bangladesh agriculture during the two periods considered above. In other words trend in agricultural production tend to support a retardation (declining growth rate) hypothesis [14, p. 48].

Farm Structure—Organization of Agriculture

The average size of farms in Bangladesh was found to be 3.5 acres in 1960 [36] and data relating to 1967/68 indicated a decline in the average size to 3.2 acres [34]. Regional variation in the average size of holding is not very significant. The average size does not change much whether one considers landholding on ownership or operational basis.

Although the average size of holding is small, its distribution is highly skewed. Data on the size distribution of landholding (operational) in Bangladesh are available from the Agriculture Census [36] and Master Survey [34], and also from a number of surveys carried out by the Bangladesh Institute of Development Studies (BIDS). Percentage distribution of farms and farm areas are shown in Table IV. Data for 1974 are taken from a survey of eight villages carried out by BIDS during October-November 1974. It is clear from the table that the majority of farms belong to less than 2.5 acre groups with total landholding varying between 16% and 28%. More importantly, a quarter and above of farms are less than 1 acre and their share in the total holding is 6% and less. On the other hand, only about 10% and less of farms own 7.5 acres and above but their share lies between 26% and 39%. Using 2.5 acres and 7.5 acres as dividing lines for identifying small, medium and large farms, it is found that the small farms gained (between 1960 and 1974) both in terms of their share in total farms (51% to 66%) and that in total farm area (16% to 24%), the proportion of middle farms declined (38% to 30%) but their share in total farm area increased (45% to 52%). One can offer several explanations for this trend in the pattern of distribution of landholding. In the middle size group, two forces seem to have been operating. One is the pressure of population leading towards subdivision and fragmentation through law of inheritance so that many farm households in other groups were pushed into the small size group. On the other hand, the relatively affluent households in the middle size group acquired new land (through purchase or liquidation on account of past debt) from other groups thus increasing their share in the total landholding. As for other groups the influence of law of inheritance has been supplemented by the natural pauperization process under the pressure of money lenders and declining real income per capita in the rural areas [10, pp. 737-818] and also possibly by the disintegration of rural joint family system, thus forcing liquidation of tangible assets including land. Since the evidence presented above relates to operational holding, it may have been influenced by the fact that because of the prospect

TABLE IV

**BANGLADESH : PERCENTAGE OF FARMS AND FARM AREAS
(OPERATIONAL)**

Size (in acres)	Farms (%)			Area (%)		
	1960	1968	1974	1960	1968	1974
Less than 0.5	13	12	32	1	1	2
0.5— 1.0	11	13	9	2	3	3
1.0— 2.5	27	32	25	13	17	19
2.5— 5.0	26	26	22	26	30	34
5.0— 7.5	12	9	7	19	18	19
7.5—12.5	7	5	3	19	15	13
12.5 and above	4	3	1	20	16	11

Sources: 1960—[36].
 1968—[34].
 1974—BIDS Survey.

of increased profitability under HYV technology many landlords evicted their tenants, thus turning the latter into wage labourers, partially or totally.

The trend over time in the distribution of operational landholding can be seen from Table V where two clear patterns are discernible during the period 1960 to 1974. Between the early and late 1960's the distribution of landholding slightly improved but the situation deteriorated in the early 1970's as can be seen from distribution by ordinal groups and also from the calculated Gini concentration ratios.

TABLE V

**DISTRIBUTION OF FARM AREA (OPERATIONAL) IN BANGLADESH
BY ORDINAL GROUPS**

Cumulated % of Farms	Percentage of Farm Area		
	1960	1968	1974
Bottom 10% operates	0.77	0.94	0.80
Bottom 20% operates	2.27	3.04	1.60
Bottom 30% operates	3.89	6.60	2.40
Bottom 40% operates	10.70	11.30	4.99
Bottom 50% operates	15.52	16.77	11.86
Bottom 60% operates	25.00	24.62	19.36
Bottom 70% operates	35.00	34.32	29.71
Bottom 80% operates	46.75	46.97	45.01
Bottom 90% operates	63.71	64.15	62.09
Bottom 100% operates	100.00	100.00	100.00
Concentration Ratio	0.49	0.48	0.56

Source : See Table IV.

As for tenurial arrangements, data are available for 1960, 1968 and 1974. Three broad categories may be identified (Table VI), owner farms, owner-cum-tenant farms and tenant farms. Tenants operate land either on cash rent or on share-cropping basis. There are other intermediate variants but they are not important. Owner farms accounted for 61 % of total farms in 1960 and the proportion increased to 67 % in 1974. During the same period percentage of owner-cum-tenant farms declined from 37 % to 27 % and that of tenant farms increased from 2 % to 6 %. Small proportion of tenant farms indicate that there is a preference on the part of the land owners to rent out land in share-cropping to other landowners, large or small. On the other hand, landless farmers who could operate land as pure tenants do not have implements or working capital required for carrying out self-managed farming.

TABLE VI
BANGLADESH : LAND TENURE

Type of Tenure	Average Size of Farms (acres)			Percentage of Farms		
	1960	1968	1974	1960	1968	1974
Owners Farms	3.1	2.7	2.3	61	66	67
Owner-cum-Tenant Farms	4.3	4.0	4.1	37	30	27
Tenant Farms	2.4	3.0	2.4	2	4	6
Total	3.5	3.2	2.8	100	100	100
Farm Area (percentage)						
	1960	1968	1974			
Owner-operated	82	83	75			
Tenant-operated	18	17	25			
(i) Cash Rented	2					
(ii) Share-cropped	16					

Source : See Table IV.

In terms of area operated only about 18 % are tenant operated of which 16 % are share-cropped. Average size of farm is highest for owner-cum-tenant in all years for which data are available. It was observed before that share-cropping and pure tenancy have equalizing effect on the distribution of landholding. Data from limited surveys are available to test this hypothesis. For example, a number of BIDS surveys have revealed the following pattern in the distribution of landholding on ownership and operational basis as measured by Gini concentration ratio (Table VII).

TABLE VII

BANGLADESH : CONCENTRATION RATIOS FOR LANDHOLDING, 1974

Area	Ownership	Operational
1. Phulpur	0.47	0.40
2. Thakurgaon	0.55	0.42
3. Brahmanbaria	0.44	0.41
4. Bangladesh	0.59	0.57

Source : BIDS Surveys.

What is important to note is that the category owner-cum-tenant has declined in importance while (in terms of proportion of farms) pure tenant group gained significantly. This trend has been interpreted by some as a kind of polarization process taking place as a result of the development of a "dynamic capitalist sector within agriculture, accompanied by the alienation of the small and marginal farmers from their land" [4, pp. 13-14]. Without a deeper analysis of the organization of agriculture in Bangladesh such a conclusion appears to be premature. It should be added here that farm area under arrangements other than owner management is still a relatively small proportion of the total farm area and that family labour provides the major input into owner-operated farms. Furthermore, in order to identify the causes of changes in the composition of farms by types of tenure and to understand implications of such changes, one must analyse the situation under which arrangements like share-cropping are acceptable to the contracting parties and also look at how these situations change over time. For example, any combination of the following situations will make crop-sharing a desirable alternative from the point of view of the owner as well as the tenant : (a) the farming unit is too small for economic operation, (b) the farm area is either too large or too fragmented for efficient management by the owner, (c) the owner does not have access to adequate fixed and working capital, (e) the farm may belong to absentee landlord, and (f) the owner may not have adequate supply of family labour.⁶

The important question that is raised here is whether the pattern of land distribution and the prevailing tenurial arrangements act as hindrance to agricultural growth, particularly in the process of modernizing the rural sector. Not enough is known about the dynamics of rural development in Bangladesh for anyone to be able to provide a definitive answer. Studies on the relationship between farm size and productivity reveal that smaller farms are relatively more productive than larger ones [40, pp. 469-500]. This relationship possibly holds true by types of

⁶Raquibuz Zaman found (a) and (b) to be important factors in two areas of Bangladesh [58, pp. 153-54].

tenure. On the other hand, there does not appear to be any significant difference in productivity (yield per acre) by types of tenure. In point of fact, share-cropping arrangement may be more socially desirable than owner-operation with hired labour. This follows from the familiar argument that the share-cropper who uses family labour will tend to increase labour input until its marginal value product is zero while the owner operator employing hired labour will equate marginal value product with the market wage rate. Here the nature of cost-sharing practices will play an important role [58]. It has also been observed that acceptance of new technology (e.g., HYV) is not affected significantly by types of tenure. However, the relationship between tenurial arrangements and adoption of new technology is not yet clearly established [18].

Saving, Investment and Agricultural Credit

In Bangladesh, like many other developing countries of Asia and Africa nothing much is known about saving originating from the agriculture sector. One set of estimate based on macro-economic time series data indicates that rural saving as a proportion of rural income increased from 4.2% in 1959/60 to 6.3% in 1969/70 [14]. These should be contrasted with estimates based on cross-sectional survey of rural income, saving and investment. For example, quarterly survey data placed the figure for average rate of saving in rural areas at 12% [20, p. 185]. Yet another estimate based on data from micro village survey obtained a figure of 21% [38, p. 33]. Such conflicting results have also been found in other developing countries, e.g., India [11]. They can be largely attributed to (i) difference in coverage of data and (ii) difference in the concepts used to measure income, saving and investment. Clearly, nothing very useful can be said on saving in the rural sector and also in the agriculture sector until serious attempts are made to reconcile the conflicting estimates and arrive at a reasonable basis for analysis.

Reliable estimate of investment in the agriculture sector on both public and private account is not available. The Central Statistical Office (C.S.O.) of Pakistan provided some figures for private investment in agriculture during 1963/64-1969/70 but figures for the public sector investment in agriculture were not given separately. However, one can obtain data on public sector development expenditure in agriculture and water sector which include both investment and non-investment development expenditure. According to the C.S.O. estimate, private sector investment in agriculture averaged about Tk. 323 million during 1965-69 [35, p. 14]. If one applies the ratio of private to total investment in all sectors to estimate total investment in agriculture, the total will represent about 6% of agricultural income which is very low indeed. Here again the problem of using national aggregates as opposed to cross sectional survey data reappear. Whatever is known about income

growth in the agriculture sector in Bangladesh, it is apparent that given the capital/output ratio, the rate of net investment was rather modest, not enough to produce a break-through although some figures on the rate of gross fixed investment in agriculture look very impressive indeed.

A number of factors seem to have combined together to account for a relatively low rate of net saving and investment in the agriculture sector of Bangladesh. Traditionally the feudal lords or their colonial master never took any interest in the development of agriculture. They were just satisfied with extracting a fixed rent from land. The cultivators on the other hand, either did not have enough resources at their disposal to undertake investment or did not have enough profitable investment opportunities to be encouraged to save more. Lack of surplus is true for a large number of farming families particularly in view of the continued low productivity in agriculture. Besides, financial intermediaries in the agriculture sector was almost non-existent so that farm households did not quite develop the habit of acquiring financial assets. In many cases insecurity of the tenurial status has acted as a disincentive towards increasing saving and investment. Risks of crop failure and absence of any form of crop insurance scheme has also made farmers shy of undertaking substantial investment for raising productivity which in turn has negative effect on the growth of saving.

Saving and investment in agriculture are very closely related to the supply of and demand for agricultural credit. Availability of credit is important for rural households in order to be able to finance current consumption expenditure or expenditure on durable and non-durable capital which in turn will increase income and saving. Besides, an easy access to credit will provide incentive to the farm-household to increase its effort at generating saving on its own account.

In Bangladesh, like many other developing countries, the supply of credit for financing investment expenditure in agriculture falls short of demand. No firm estimate is available of the total credit requirement of farmers. Available information indicate that farm households require short, medium and long term credit which are usually put into following uses; (a) Family expenditure, (b) Farm expenditure—current and capital, (c) Non-farm business expenditure, (d) Other miscellaneous and (e) Repayment of old debts. Data from various surveys indicate that approximately 50 per cent of the total borrowing is used for family expenditure [15, p. 35; 17, p. 14]. The rest is divided between current and fixed capital expenditure. It is important to note that fixed capital expenditure has never been found to account for more than 20% of total borrowing except in a 1965 survey

where it was found to be 25.6% [17, p. 14]. Furthermore, there is an inverse relationship between size of landholding and the percentage of borrowing used for family expenditure while the relationship between landholding and capital expenditure is positive.⁷ The important question here is whether credit used for family expenditure should be considered non-productive. The consensus among various writers seem to be that in a country like Bangladesh where majority of the farm families operate at the subsistence or the below subsistence level, at least a part of the family expenditure should be included under working capital. It may be mentioned here that shortage of working capital make the small farmers even more vulnerable to the exploitation by landlords and moneylenders. Preliminary investigation of the dynamics of the asset liquidation process has revealed that the weaker elements among the smaller farmers with little staying power have been the first ones to be squeezed out of their meagre asset holdings under the pressure of natural calamities like flood and famine.⁸

Exploitation of small farmers through the operation of the credit market is possible because institutional sources provided only about 15% of the total credit supply in Bangladesh. The situation has remained unchanged over the years. In general it is found that farmers with larger holdings have greater access to institutional credit [17, p. 23]. This is only to be expected where traditional concept of credit worthiness is an important basis for distribution of credit. The non-institutional market remains an important source of short term capital and consumption credit. Related to the above is the fact that the tenurial status of the farmer may affect his accessibility to different sources of credit particularly the institutional ones [17, p. 25; 58, p. 157]. This is also what enables the moneylenders and the like to impose upon the weak borrowers very stringent terms of credit. In Bangladesh instances are found where borrowers are made to pay a rate of interest exceeding 200% on loans from non-institutional sources as opposed to a low rate between 5% and 15% charged by various institutional sources [16; 45].

New Agricultural Technology

The new agricultural technology has two dimensions : (a) introduction of mechanization and (b) introduction of seed-fertilizer-irrigation technology. The different Plan documents during the Pakistan regime and also the First Plan of Bangladesh relates the introduction of new technology to the attainment of the

⁷Such a clear relationship can be found in Asaduzzaman [15, p. 35] but Asaduzzaman and Hossain could establish this only by classifying farms under below average and above average groups [17, p.16].

⁸This is the impression one gets by examining the data collected in a recent survey of the famine situation in Bangladesh by BIDS.

following objectives : (i) increase agricultural output, in particular attain self-sufficiency in the production of foodgrains; (ii) create employment opportunities in rural areas and (iii) reduce rural poverty and promote equality of income distribution. It is, however, interesting to note that all discussions on new technology is centred round improving the productivity (yield rate) of rice land although occasional references are made to other crops.

Because of some structural characteristics of the agriculture sector (e.g., small size of holding, high degree of fragmentation, presence of reserve army of unemployed and underemployed labourers and extreme poverty of the majority of farm households) in Bangladesh, programme for extensive farm mechanization has never been emphasized as one of the means of achieving objectives of agricultural development. Thus, farm mechanization has taken place only to very limited extent and its impact on overall agricultural production has been rather insignificant.⁹ The First Plan of Bangladesh recommends use of tractors and power tillers on an experimental basis in a pilot project, the results of which will be utilized to formulate future policy of mechanisation [33, p. 180].

In Bangladesh the new seed-fertilizer-irrigation technology was introduced in different phases. During the earlier years it was confined to fertilizer distribution and some irrigation with a small number of pumps and tubewells. HYV seeds of rice were not introduced until 1966, when a new variety of rice called IR-8 which could be grown in *boro*¹⁰ season with irrigation was distributed. In 1970 another variety called IR-20, an *aman* season crop was introduced. It is claimed by many experts that substantial expansion of output is possible with this variety even under rainfed condition although supplementary irrigation would be quite helpful. This was followed by import and indigeneous development of a number of other HYV seeds (e.g., IR-5, IR-442, *Chandina*, *Mala*, *Biplab*, and *Mukti*).

The HYV acreage in 1972/73 was about 2.6 million acres which was about 11% of the gross cropped area under rice. In terms of output it accounted for about 25% of the total rice production in the country. Both of these figures appear to be way below the potential expansion frontier. What is also important to note is that *irri-boro* continues to dominate the HYV acreage. This is largely explained by the higher risk factor associated with HYV during *aman* season, particularly those under rainfed condition.

⁹As of 1970 there were 2072 tractors and 2,571 power tillers in use in Bangladesh [32, pp. 62-63].

¹⁰*Aus* (April-July), *aman* (July-December) and *boro* (December-March) are the three major traditional varieties of rice.

Available data indicate a wide range (between 13% and 363%) within which yield per acre under HYV exceeded that under traditional variety. Such variation is possibly explained by differences in environmental (socio-economic and physical) factors and also in the management factor. Preliminary investigation in Bangladesh so far revealed that introduction of HYV has positive impact on employment, productivity and profitability and it has also been found to have smoothened the extreme seasonality in agricultural employment [5].

Along with the above findings, one need to take note of the fact that introduction of HYV has not made any significant impact on the real wages of agricultural labourers and it seems to have been accompanied by a period of increasing inequality in rural income and landholding and also of increasing incidence of poverty [10; 12]. Available evidence for Bangladesh is inadequate to make any definitive statement regarding the distributional implication of HYV technology.

The question, however, remains why is the rate of diffusion of the new agricultural technology is so low in Bangladesh. At the present state of our knowledge it is only possible to promote some speculative hypotheses explaining the rate of adoption of the HYV technology. Preliminary findings from a recent BIDS survey [18] indicate that about 52% of all farmers has adopted HYV but devoted only 18% of their cultivated land. The adopters owned about 60% of the total cultivated land and therefore, it is surprising that only about 11% of the total cultivated land was devoted to HYV. One must look for an explanation of this into the general environmental condition. For example, the seed-fertilizer revolution requires for its success sufficient and timely supply of inputs, adequate extension services, availability of irrigation facilities and an elastic supply of credit. From the accounts given in the earlier sections it seems that none of these conditions have been fulfilled in Bangladesh. In particular, the different cooperative efforts attempting to apply a 'model farmer method' for providing extension service was not very successful since it largely ended up being 'limited purpose groups' ignoring the basic task of training and channeling credit flows [44, pp. xvi-xvii].

Although there is some scope for debate the balance of evidence seems to indicate an inverse relationship between farm size and rate of adoption of HYV technology measured by the proportion of land devoted to HYV [5, pp. 9-10; 44, p. 6] which is a more meaningful indicator in terms of assessing the impact of the new technology on output and employment. When this is combined with the other finding from the BIDS survey that the percentage of farmers adopting HYV is highest among owner-cum-tenants (63% as opposed to 48% for owners and 25% for pure tenants), one gets an explanation (though it may only be a partial one)

of the above finding. This is so because largest concentration of the owner-cum-tenant group occurs in the 0.5 to 5.0 acres range (69%) [36] and also because they are able to distribute a part of the risk associated with the adoption of HYV to the landlord. One can also add to it the innovative and productive nature of the relatively smaller farms in developing countries. However, since tenant-operated area accounts for only about 18% of the total cultivated area, it is not surprising that the overall expansion of the HYV acreage has been rather limited. The question, though remains to be investigated why the relatively large farmers have not been adopting HYV at a faster rate in spite of some apparent built in factors operating in their favour.

One final shot at speculation could be taken by relating the rate of adoption of HYV to inequality in the distribution of land-holding (operational). The data clearly reveal that the rate of adoption in terms of acreage proportion among adopters in the BIDS survey areas is higher than national average (18% as opposed to 11%) and the distribution of landholding is less unequal (measured by Gini concentration ratio)¹¹ which indicates that a land reform producing more equitable distribution of landholding will possibly increase the rate of adoption of HYV.

Political Economy of Agricultural Development¹²

In order to understand the structure of agriculture sector and explain its stagnation which resulted in widespread incidence of poverty in rural areas, one must analyse the village society, its class structure, leadership characteristics, kinship relations, property and production relations and last but not the least the relationship between the village power elite groups and the national power elite groups. Unfortunately, this is an area where our ignorance is most pronounced in the sense that no scientific investigation has been carried out to put the socio-political profile of the Bangladesh village society in the right perspective. But in the context of the present analysis, few observations—however, speculative they may be—are in order.

There are three basic questions that one should consider. (a) Can one clearly identify different classes in rural Bangladesh? (b) How should one characterize the modes of production in agriculture? (c) What was the role of the national

¹¹Concentration ratios are as follows :

All Farmers	0.41
HYV Farmers	0.34
Bangladesh 1960	0.49
1974	0.56.

¹²I benefited greatly from discussions with my colleagues Dr. A. Ghafur, Mr. A.A. Abdullah and Mr. M. Asaduzzaman. However, they do not necessarily share my views entirely.

power elite groups in rural development ? How does their action tie up with the influence exercised by the local power elite groups in the village society ? Before one seeks to answer these questions it may be worthwhile to review the way in which social relationships tend to influence the production, saving and investment decisions of farm households.

Production, saving and investment decisions, while forming basic components of the economic universe of the farm household which ultimately determines the pattern of the growth of agriculture sector, are taken within a larger framework dominated by social relationships. For example, other things remaining the same, how much capital formation a household will undertake on its own account will depend on the surplus generated and the degree of access to external resources (credit, transfer etc.). Amount of surplus will be determined, among others by the level of current income which in turn is a function of the control over productive assets. Control over productive assets, particularly land is determined historically by an interaction of social, cultural, economic and political forces.

Pattern of ownership of productive assets releases a set of forces that determine the relationship between various groups in the society which ultimately influence the behaviour of individual households. For example, the behaviour of a farmer will be different depending upon whether he is a owner farmer or a tenant farmer, he is a lender or borrower, he belongs to a high caste or a low caste, he has access to political power or not, so on and so forth. The relative position of a household with respect to various groupings determine essentially whether it belongs to a dominant group or a dominated group. The growth of the agriculture sector depends on the extent to which the interests of the different groups coincide. It should, however, be pointed out that in most of developing rural societies the status of the farmer and the various social relationships are overlapping. In this way rural societies are characterized by multiplex social roles, which influence the nature of economic transactions and activities within it. The subsistence nature of the rural economies of the developing countries can be attributed to the prevailing property relations and production relations. As long as there will be no change in these relations, the fundamental character of these societies will remain the same. Presence of a large non-monetised sector in the economy can not be necessarily termed as a sign of backwardness, rather it is the outcome of a rational decision making process in which the farmers try to minimize loss due to risk taking and uncertainty bearing.

In Bangladesh, like many other developing countries, one can identify different classes on the basis of a number of criterion e.g., tenurial status, ownership of productive assets particularly land, lender-debter relationship and caste. One

could, however, debate whether anyone of the above should be considered as an adequate basis for identifying classes in the rural society. Without going too far into the controversy, it is suggested here that ownership of productive assets can be used as a first approximation of a yardstick for identifying classes in the rural society of Bangladesh. In other words, formation of classes has centered round property relations and all the other types of relations appear to be following from it. For example, the different tenurial arrangements in Bangladesh are direct consequences of, among other, pattern of landownership and the level of technology. In most instances political and social domination also seems to originate from the pattern of landownership. In this context one should not minimize the importance of factional groups or kinship groups which tend to cut across various other types of social groupings including one based on landownership. However, the fact that such institutions have not been documented so far very extensively, is an indication that they are possibly not that important and for the purpose of our exposition could be ignored.¹³

Therefore, to begin with one may identify three different classes viz., small, medium and large farmers. The dividing lines can not be very accurately laid down because one needs to vary them across regions and also over time. Earlier in the analysis we used 2.5 and 7.5 acres as two dividing lines. Within each class major interests of the members are identical or at least not in apparent conflict while between classes there are major conflicting interests. However, one can not rule out interclass alliances on certain issues, e.g., surplus farmers irrespective of their class and tenurial status will try to resist attempts by the government to procure, on a compulsory or a voluntary basis, agricultural output.¹⁴ Again class alliance between any two may work against the third. For example, large farmers may share their access to inputs with middle farmers because a significant proportion of the latter group rent in land from large farmers who in their turn would like to have a higher rate of return in terms of share received.

The three classes identified above differ in the degree of access to economic, social and political power which essentially determines feasible range of exploitation and domination of one group by another. If one were to prepare an 'index of power' with suitable weights attached to economic, social and political dimensions, the rank ordering from top to bottom will possibly follow large, medium and small farmers. Supporting evidence could be found from per capita income of different

¹³For a discussion of the role of factional relations in the village society particularly its implications for development programmes, see [29, pp. 336-38].

¹⁴The foodgrain procurement drives of the Bangladesh government are cases in point. In 1973/74 only 73,000 tons of paddy were procured as against the target of 400,000 tons.

groups,¹⁵ and representation of different groups in local institutions e.g., union councils [46], cooperatives [4; 53] and social leadership groups ("matbars" and "sardars") [22]. It may be pointed out here that the socio-economic characteristics of the dominant groups or leadership elements indicate that they are drawn from both large and medium farmers. Under traditional technology, the line of dependence goes in one direction, that small farmers are almost entirely dependent on large and medium farmers and the latter are partly dependent on large farmers either through landlord-tenant and or debtor-creditor relationships, ignoring for the moment other factional or kinship relations. When technology is changing, as it is under HYV in Bangladesh, the lineage of dependence moves in both direction, depending again on the degree to which large farmers tend to take advantage of the HYV technology. The large farmer group can expand HYV acreage either by giving out more land to the share-cropper or under other tenurial arrangements and then force or persuade the tenant to adopt HYV. On the other hand, they may bring in more of their own land (even acquire some by evicting tenants) under HYV applying more hired inputs. In one instance they are dependent on the farmers belonging to other groups (tenants) for the supply of managerial (supervisory) skill and in the other for the supply of labour, although in a labour surplus situation the latter may not be significant. However, both situations imply that the economic power base of both the medium and small farmer groups will be strengthened thus threatening the hegemony of large farmers. This process has actually started under the influence of other exogeneous forces, such as education, political patronage, alternative employment opportunity in non-agriculture etc. Therefore, the dominant groups may react by, on the one hand, limiting adoption of HYV on their own land and on the other hand, discouraging adoption of HYV on the share-cropped land. They may also go so far as to sabotage the working of the institutions (e.g., cooperatives) that are potential instruments of expansion of HYV [3]. This may partly explain the pattern observed earlier in the adoption of HYV by size of holding.

Closely related to the class structure of the rural society are the prevailing modes of production in agriculture. According to one line of interpretation, one might assert that the mode of production dominating agriculture determines the class composition of the rural society. There is considerable debate as to how should one characterize the modes of production in Bangladesh agriculture. For example, Bangladesh agriculture has been identified by different persons as feudal, semi-feudal and capitalist. Abdullah *et al.* maintained that... "the modes of production which give rise to clear class distinctions are both at best vestigial in Bangladesh" [4, p. 25]. However, elsewhere Abdullah discussed two contending view points

¹⁵BIDS surveys.

which describe Bangladesh agriculture as semi-feudal or capitalist and comes out in favour of the latter as the dominant mode of production in agriculture. According to him "... our agriculture is more capitalist than anything describable as semifeudal..."[3]. Among economists who participated in this debate this view is shared by Akhlaqur Rahman [56]. According to him, the pattern of landownership, disparity among farmers, consolidation of landholding, internal contradiction in agricultural production, current production relations, division of labour and the application of modern production equipments, all indicate that the nature and characteristics of Bangladesh agriculture is capitalist. He further maintains that share-cropping, moneylending, mortgage, fixed renting, are all manifestations of a capitalist agriculture. Feudalist characterisation is rejected by all on the basis of the evidence that in Bangladesh only about 18% of the land is tenant operated.

It seems that the concept of capitalist agriculture applied by the above authors is rather a flexible one in the sense that if one were to take a more rigid view and apply the criteria suggested by Rudra,¹⁶ then it is doubtful if a significant proportion of Bangladesh agriculture would be considered as capitalist. Bangladesh agriculture should be characterised as containing mixed modes of production. Elements of feudalism, semi-feudalism and capitalism are all present in Bangladesh agriculture, although in the absence of hard data the relative importance of each can not be clearly spelt out. More specifically elements of feudalism can be found in pure tenancy with fixed rent where the tenant operates the land primarily on the basis of family labour and production is mainly for own consumption. In the context of Bangladesh one need not look for a well defined group of serf labour or tied labour although it may not be difficult to find some. According to 1960 agricultural census about 2% of the total farm area fall under this category. One must add to it the owner cultivated area where production is primarily dependent upon draft power and implement, hired on a fixed rental basis. Share-cropping with 16% of farm area could be characterized as semi-feudal. Furthermore, this should also include the area where crops are tied partially or totally through forward sale and short term borrowing. Finally, the remaining portion of the Bangladesh agriculture should be characterised along a scale, at the two ends of which we have pure capitalist farmer and the pure subsistence farmer. With the mixed picture presented above, it seems that no useful purpose will be served by focussing on only one mode of production and ignoring the others.

¹⁶The criteria are based on wages per acre, value of output per acre, value of modern capital equipment per acre and cash profit per acre for its farmer [59, p. A85]. Utsa Patnaik applied these criteria to data from selected areas in India to measure the extent of capitalist development [54, pp. 123-30].

The final question that remains to be discussed in relation to the political economy of agricultural development is the role of the national power elite groups in agricultural development, in particular their relationship to the power elite groups in the village society. The national elite group in the immediate post colonial period was the one that led the national independence movement and members of this group were drawn from princely aristocracy (Nawabs), landed gentry, and urban gentry. The thrust of the movement being national liberation from colonial domination on the one hand, and Hindu domination on the other, issues related to rural development or upliftment of the poor peasant were never focussed sharply. People were always led to believe that in the wake of national independence, measures will be taken and all wrong doings of the colonial rule will be corrected. Unfortunately for Bangladesh, no initiative really came from the national elite to make a beginning at rural development except the Act of 1950 that abolished zemindari system which in a way eliminated the feudal landlords as the dominant force in the society. It also set a ceiling on landholding at 33 acres. The political history of the following years during the Pakistani regime is marked by struggle primarily on the basis of establishing legitimate position of the Bengalis in the decision making process and putting an end to the exploitation of Bangladesh by the West Pakistani capitalists.

It is interesting to note that except on two occasions, the national leadership never had to come face to face with the people, particularly the rural masses and be confronted with issues of social and economic development which would have had implications for changes in the structure of the rural society. The political parties in power or in the opposition never tried to build up a tempo for social and economic development of the country and of the rural areas in particular. The Six Year Plan and First Five Year Plan under the Pakistani regime were only apologies for development planning and there again agricultural development was assigned a very low priority. This in effect only reflected the fact that the national leadership was insensitive to the needs of rural development. No significant challenge came to the leadership from the peasants as no political movement was ever developed around them. Political leadership of both parties in power and in the opposition came from urban areas (although many had links with villages) and responded rather quickly to the urban demands. This was the general pattern during the 1950's until Ayub Khan emerged on the political scene of Pakistan.

After having eliminated effective political opposition, Ayub regime brought itself into direct contact with people and it was forced to make some gestures at mobilising administrative forces for nation building activities. Quite purposely the regime attempted to shift its power base from the urban areas to the rural elite

and created a class of basic democrats with which it was able to sustain itself in power for better part of a decade. This was accompanied by a number of other measures, e.g., (i) removal of regional disparity was made a constitutional obligation, (ii) planned economic development through formulation and implementation of Five Year Plans was taken up more seriously, (iii) an increased allocation of resources was made to agricultural and water resource development, (iv) a rural works programme was introduced, (v) land ceiling was raised from 33 acres to 125 acres and finally, (vi) through various fiscal, monetary, commercial and administrative measures an era of unprecedented growth of private capitalism in industry and commerce was ushered in.

For Bangladesh the above measures meant some growth of agricultural output and a modest increase in real wages, income and employment in the rural areas in the early 1960's. However, neither was the growth impulse very significant nor was it sustained for too long. The polarization and pauperization process in the rural areas continued and by late 1960's downward movement in real wages, income and employment was well set in [10, pp. 740- 60]. Only half hearted attempts were made at agricultural transformation through diffusion of new technology and this point has already been discussed above. No serious attempt was made by the political leadership to overcome the social and structural barriers at the local and national level so that potentiality of an agricultural revolution could be realised. All these were not surprising since the rural poor (small farmer group and landless peasants) did not have the political muscle to challenge the authority of the ruling elite. The large farmers and a portion of the middle farmer group, to the extent they were reaping the benefit of various types of patronages distributed by the regime translated primarily in terms of control over resources, did not feel obliged to form alliance with the other classes and overthrow the government.

The challenge to the national political leadership came in the late 1960's but in the form of extreme polarization on the regional disparity and autonomy issue. The ensuing movement saw a unique alliance of the different classes in the rural areas with the urban vernacular elite and industrial labour which swept the national political leadership out of power and eventually culminated in the liberation of Bangladesh. Now during the period when the movement for regional autonomy and then for political independence of Bangladesh—essentially between 1966 and 1971—was going on, problems of rural development were relegated to the background.

With the liberation of Bangladesh the national political elite had to confront the people directly for the second time. The ruling party's immediate answer

to the question of agricultural and rural development was introduction of a land reform that lowered the ceiling to 33 acres, a level set earlier in 1950 and elimination of land tax upto 8.6 acres. No basic measure was taken to help the rural poor neither any attempt was made to provide a base for long run sustained agricultural development by introducing structural changes in the rural areas. The ruling elite was successful in using the plea for post-war reconstruction for pushing off any pressure for making fundamental structural changes in the village society which would disturb the *status quo* too much. The national leadership basically continues to be urban based and the link with the village society exist through some local members of parliament or local party leaders who belong to the relatively large landed interest groups and exercise influence in the local power structure through their agents drawn mostly again from large farmer and middle farmer groups. A new era of patronage distribution is continuing and there being no political forum to organise the alienated farmer groups, the interest of these groups and also the subject of overall agricultural growth are being ignored. The above has combined with the rampant inflationary pressure to expedite the pauperization process in the rural areas during the post-liberation period and the climax was reached in 1974 when a flood immediately created a famine situation causing death to many and making a significant addition to the permanent destitutes in the country.

III. EVALUATION OF POLICIES AND INSTITUTIONS

Land Reform¹⁷

It is argued by many that in developing countries of Asia and Africa land reform is a key measure for bringing about fundamental changes in the structure of agriculture. The proponents of land reform in these countries argue that it will ensure both increased productive efficiency and equity. However, there is an equally strong opposing view which maintain that although land reform may be desirable from the point of view of equity and distributive justice yet it may not be worthwhile since there is a very significant trade off with productive efficiency. The argument runs along the lines that land reform will result in a fall in agricultural output, marketable surplus and saving. Fall in marketable surplus and saving are related to fall in net output due to an increase in production costs per acre, and also to an increase in own consumption.

In point of fact, the resistance to land reform in most societies is based on social and political rather than economic arguments. The landed interest always

¹⁷This section draws heavily from an excellent piece of work done by Abu Abdullah at BIDS [1].

represented a strong political force and there are instances where their representation in the national political elite groups was more than proportionate enabling them to wield more political power than what their number would justify. Therefore, land reforms are usually introduced whenever the large landed interests get alienated from the national political elite group or their influence on the latter is reduced through a political process. This is why it was easy for the Muslim dominated political elite in East Pakistan to come down heavily on the Hindu landlords and abolish the zemindari system by the stroke of a pen [1, p. 40]. Introduction of land reform represented a more painful process in West Pakistan [21] and neighbouring India [25].

In the context of a country like Bangladesh arguments in favour of land reform will run as follows. To the extent that land is a major source of income in agriculture, land reform will lead towards a more equitable distribution of income. It has already been observed that although the average size of landholding is quite small in Bangladesh, the distribution of it is highly unequal. Besides, by way of reducing concentration of economic, social and political power, a stage will be created for promoting agricultural growth.

Being a capital scarce and labour abundant country, redistribution of land from large to small farms will achieve employment expansion in the short run. It must, however, be ensured that small farms are economically viable. Under traditional technology small farmers have been found to make intensive use of both land and family labour and as such productivity per acre was observed to be higher for smaller farm than for larger ones. There is no reason why a similar conclusion should not hold under a new technology.

We have already noted earlier that in Bangladesh small farmers are relatively more responsive to the new technology than large farmers. However, following land reform it will be necessary to ensure two things, redistribution should take place in favour of families who are familiar with farming practices and adequate institutional base must be created for increased supply and widespread distribution of inputs. To the extent that the seed-fertilizer technology is scale neutral, significant positive impact on output and employment is possible. However, the accompanying needs for irrigation facilities and marketing services are not as much scale neutral as one would like them to be. Under such circumstances, formation of groups among farmers require immediate attention. This may not be necessary to a certain extent during the *aman* season when there is scope for expanding HYV acreage under rainfed condition. All of these arguments can again be used to contest the assertion that a land reform may lead to a reduction in marketable surplus and

saving. What may really be at stake is less than proportionate increase in marketable surplus which has important implications for mobilising surplus output.

Closely related to question of land reform is the need for changes in tenurial law and practices so as to restore security of tenancy as well as to ensure a reasonable rate of return to the tenant family labour. It is contended that land tenure system prevailing in any area has important effect on the production, saving and investment behaviour. For example, in a situation where the tenant does not have any security of tenancy he will have little incentive to make worthwhile improvement of land or the irrigation system which are two important forms of non-monetised farm investment. On the other hand, this may be partially offset if the landowner attaches a condition to tenancy in terms of making the tenant undertake such investments (which implies contributing free tenant labour with or without material input towards land improvement etc.). Similarly, the owner operator has a personal stake in his own land so that he will have the incentive to undertake non-monetized farm investment.¹⁸ Besides, other conditions are also important in terms of their effect on rural savings and investment. Thus, both the terms of cost-sharing and input-sharing will affect the work incentive of the tenant. Therefore, the more equitable the cost-sharing is between the tenant and the owner, and the more favourable the output-sharing is to the tenant, the greater will be the incentive of the tenant to be more productive and undertake investment on the farm and also perhaps adopt new technology. What is being suggested is simply that the tenant will decide upon his production, saving and investment activities on the basis of the possible rate of return to his family labour.

Only some limited information is available in the Indian context on the relationship between tenancy and capital formation. These studies are due to D. Jha and S.D. Salunke [47], K.K. Chauhan and N.L. Agarwal [24]. In general, secure tenants and owners undertake relatively more long term investments (e.g., land reclamation, machinery, new technology etc.) than others.

Under the British rule most of the land in Bangladesh was "permanently settled". A large number of zemindars and independent Talukdars exercised control over land in return for payment of land revenue to the government which was to be paid out of the rent they were authorised to collect from the raiyats who cultivated land either themselves or through subletting to under-raiyats. In course of time a large number of rent collecting interest groups emerged who intermediated

¹⁸In a large farm, however, the owner cultivator may be unable to exploit the potential of the land fully and he may not in some cases undertake any investment at all. This will, to some extent, be a function of the availability of family labour.

between the state and the raiyat. As Abdualh [1, p. 4] points out, the crown was somewhat ambivalent in its attitude towards the landlords and through a series of legislation the proprietary rights of the zemindar over land was reduced. Following Abdullah the situation at the time of partition of India could be summarized as follows. "...there were some very large and numerous very small proprietors, a numerous class of intermediate tenure-holders, and at the bottom of the pyramid, the large labouring class of raiyat and under-raiyats, among whom also there was some degree of economic stratification" [1, pp. 15-25].

The first land reform law after partition was passed in 1950 when under the East Bengal State Acquisition and Tenancy Act, all intermediate rent receiving interests were abolished and a ceiling on landholding was set at 100 bighas or 33 acres. However, there was no significant redistribution of landholding since only a small amount of excess land was surrendered. The scope for redistribution was further reduced when an amendment under East Pakistan Ordinance No. XV in 1961 raised the ceiling to 375 bighas or 125 acres. Total land available for redistribution was only 163, 741 acres and most of it was unfit for settlement [1, p. 29]. Our analysis of the growth of the agriculture sector in the 1950's does not indicate any change in the efficiency of the sector. The important effects of this reform were, the elimination of zemindar as a force in the rural society and an increase in the amount of land revenue collected by the government. It is important to note that the above act and its amendments did not seriously affect the condition of the rural poor, the landless labour and the share-cropper.

After the liberation of Bangladesh two presidential orders (P.O. 96 and 98), "The State Acquisition and Tenancy (Third Amendment) Order 1972" and "The Bangladesh landholdings (limitation) Order, 1972", were promulgated. While the first exempted family holdings upto 8.3 acres from payment of land revenue, the second restored the land ceiling imposed in 1950. Given the average size of family holding, the land revenue exemption limit almost eliminated it as a source of revenue for the government exchequer. In any case the amount of assessment on family holdings was rather small to begin with so that the exemption did not really imply a significant relief for the farm households and its incentive effect on production is likely to be very negligible. The distribution effect of P.O. 98 appears to be as negligible as that of Act of 1950 [1, p. 61].

The attempted land reforms in Bangladesh have not yet had any significant impact on the agricultural and rural scene in terms of increasing efficiency and promoting equity. We have already observed that exploitation and domination of one class by another in various forms are still continuing in the rural society. Clearly, the ceiling have been set at too high a level to bring about a fundamental

change in the structure of the village society. It is clear that the ruling elite was never really very serious about redistributing landholding. Abdullah maintains and we tend to agree with him that "A policy of really drastic land redistribution, perhaps with a ceiling of 5 acres per family, might promote both production and equity" [1, p. 67]. However, it is also important that tenurial practices are effectively altered. To quote the First Plan of Bangladesh "Measures need be taken to serve the right of the share-cropper to cultivate rented land as long as he wants it, if rent is paid, to ensure compulsory registration of tenancies, and to significantly improve the share of tenant in the produce of the land" [33, p. 191].

Pricing, Procurement and Exchange Rate Policy

The government from time to time adopted policies which had important implications for agricultural prices, production, allocation of resources and inter and intra sectoral distribution of income. These policies, however, did not always achieve these objectives and in certain areas the outcome was rather socially undesirable.

In the early 1950's, a combination of vigorous import substituting industrialisation under protective tariff barrier and export taxes on major exportables (e.g, jute) had an adverse effect on the terms of trade of agriculture vis-a-vis the manufacturing sector [50; 51]. It also depressed the domestic prices of raw materials. This was combined with a jute acreage licencing policy¹⁹ which although was ineffective in the face of relative prices of jute and rice, did create a generally depressing environment for jute production. Besides, export taxes implied a lower price for jute growers, an outcome which was highly inequitable. Jute acreage licensing was abolished in 1959, thus eliminating a significant administrative cost. Reduction of export duties came rather late in December 1964 when the rate was reduced from Rs. 20 per bale to Rs. 10 per bale [28, pp. 53-55; 43, pp. 7-8]. This led to an increase in the growers' price of jute [32, p. 130] and an increase in production but it was not sustained for too long as the jute/rice price ratio moved against jute [55, p. 10]. The unfavourable price movement for jute continued even more prominently in post-liberation Bangladesh (except in 1972 when devaluation had a favourable impact) when a reduction in the jute acreage was experienced. Government's answer to this trend in jute/rice price ratio was to set a minimum price for growers. The minimum price was also intended to help the growers against the exploitation by middlemen, but the general belief is that the minimum price is never enforced in reality.²⁰ Two other policy instruments were

¹⁹This was pursued with a view to be able to restrict output, exercise the monopoly power to raise export price.

²⁰Government tries to implement minimum price through the Jute Marketing Corporation whose primary function is to carry on internal trading in jute so as to stabilize raw jute price.

available to the government to restore the attractiveness of jute production, e.g., change in input subsidy policy and change in the exchange rate. A beginning has been made on both fronts but it is too early to comment on their effect.

Another area where government intervened with price fixing is sugarcane. Within a defined mill zone sugarcane growers were made to sell cane to the mills at a fixed price. The factory gate price which was quite unfavourable to the growers when one compares it with the return from alternative uses, e.g., making *gur* (mola-sses), discouraged production of sugarcane and also resulted in supply of less than average quality of cane to the mills. This problem became particularly acute during the post-liberation period. The answer of the government to this problem was to revise from time to time the factory gate price of sugarcane but that again did not happen very often. For example, throughout the 1960's the purchase price of sugarcane was kept fixed at Tk. 2.50 per maund and it was raised only in 1970 to Tk. 3.00 per maund and then again to Tk. 6.00 in 1973 but the price always seemed to have lagged behind what would imply a reasonable rate of return to the growers [32, p. 200].

While in the early 1950's a number of government policy actions resulted in a downward trend in the terms of trade of agriculture, government's inaction creating a stagnant agriculture leading towards a relative decline in marketable surplus coupled with high rate of population growth and urbanisation resulted in an upward trend in the terms of trade of agriculture during late 1950's and early 1960's [43, pp. 8-10]. This trend is consistent with the trend in per capita availability of foodgrains (rice and wheat) [13, pp. 45-46]. But the foodgrain prices were stabilised throughout the 1950's and early 1960's through a system of internal procurement, imports and distribution by rationing. However, apart from early 1950's and post-liberation 1970's internal procurement was never pursued vigorously. A combination of voluntary and compulsory procurement with or without cordoning of surplus areas and five miles border (with India) belt were used by the government at various times. The procurement prices apparently were always lower than what the farmer could get on the market. In general, although the physical quantity involved was never significant, the maximum being 197,000 tons (or less than 3 % of total production) in 1959 [32, pp. 125-27], internal procurement, if anything, had depressing effect on prices and production [28, pp. 55-59; 43, pp. 11-12]. Beginning 1960 internal procurement was virtually given up except for border belt drive (primarily to discourage smuggling to India) until 1973 when it was again taken up seriously although not with much success.

The more important way in which the government intervened in the internal marketing of agricultural commodities was through the distribution of foodgrains

by a system of rationing. As mentioned above, the domestic production of rice and wheat was not sufficient to meet domestic demand; substantial import of rice and wheat in particular was therefore necessary for the entire period. Dependence on imported foodgrain increased dramatically in the 1960's particularly with the availability of import facilities under US PL-480. Considering the period when wheat imports gained importance, the ratio of total imported rice and wheat to domestic production increased from about 7% in 1960/61 to about 25% in 1972/73 [13; 32, pp. 6 and 139]. The major portion of internally procured and imported foodgrains was distributed through a system of rationing to a number of important urban centres in Bangladesh at subsidized prices. In fact, government throughout this period has accepted a substantial budgetary liability to provide subsidized foodgrain to the urban population. In essence this represents a transfer of income from other sectors to the urban areas benefiting from this system. It is interesting to note that no such corresponding privilege is extended to the more needy group, the rural poor except under especially distress situation when some foodgrains are distributed through gratuitous rationing.

With the introduction of new seed-fertilizer-irrigation technology in the late 1950's and early 1960's it was felt that its diffusion will be facilitated particularly among relatively smaller farmers if these inputs were provided at subsidized rates. This policy was immediately adopted and thus throughout the 1960's the rate of subsidy averaged about 50% on fertilizer and 100% on pesticide. The implicit water rates for pump irrigation or gravity irrigation were also very negligible. However, the supply of inputs being on the whole short of demand a black market flourished and many farmers (usually the small farmers) had to pay 2 to 3 times the controlled rate. In general large farmers gained more than the small farmers which implied that the rest of the economy was subsidizing their farming operation. It has also been observed that suboptimal price of scarce inputs have led to their inefficient use. Besides a low price for fertilizer in Bangladesh also encouraged its smuggling into India. Government attempted to lower the fertilizer subsidy substantially during the post-liberation period but as expected it faced stiff resistance from the landed interest group and had to modify its stand.

The internal pricing, procurement and distribution policies were combined with a set of exchange rate and import-export regulations which created a situation in which the implicit exchange rate for a unit of agricultural commodity was considerably lower than that of manufactured commodity and also at international prices agriculture sector was losing about 33% in its exchange with the manufacturing sector due to distortion in domestic prices. The total effect of the two was a transfer of income from agriculture to manufacturing which turned out to

be highly inequitable because it implied a transfer among others, from the rural poor to the urban rich [43, pp. 14-19].

Institutions Related to Agricultural and Rural Development

The important institutions and programmes for rural development are, the Ministry of Agriculture, Cooperative Credit Societies, Comilla Cooperatives, Rural Works Programme (RWP), Thana Irrigation Programme (TIP), and Integrated Rural Development Programme (IRDP). The Ministry of Agriculture is concerned, among others, with two directly production oriented activities. Through its extension wing it provides agricultural extension services to farmers. However, the present level of service and morale of the extension agents numbering about 4,000 at the union level is very poor [33, pp. 166-69]. The second important function of the Ministry is the procurement and distribution of agriculture inputs (irrigation pumps, HYV seeds, fertilizer) through the Agricultural Development Corporation (ADC). It has often been complained that the time profile of input procurement during a year by ADC does not always correspond with that of requirement (demand) thus adding to the uncertainty and risk factor for the farmers. Besides at the grass root level ADC has not been able to ensure either efficient utilisation (e.g., pumps) or equitable distribution of inputs (e.g., fertilizer, seeds).

The history of cooperative movement is a long one as it dates back to the beginning of the century. Most of the cooperative societies are credit societies, one important stated objective of these societies is to provide relief to the small farmers from the exploitation of the money lenders. The cooperative credit structure operates through a National Cooperative Bank, 62 Central Cooperative Banks and a chain of multipurpose (at union level numbering 4,107) and primary agricultural societies (at village level numbering 25,000) [33, p. 154; 45, pp. 6-9]. However, this movement has not been particularly effective either in terms of providing a substantial amount of credit or in terms of obtaining a substantial amount of coverage. The present coverage will not exceed 30% of total farm families. Furthermore, these societies suffered from fairly high rate of defaults as reflected in the fact that over the period 1958-75, the percentage of recovery of crop loans by the cooperatives was 70 [45, p. 26].

While discussing credit institutions, one must mention the role of the Bangladesh Krishi Bank (formerly Agricultural Development Bank) which was established in 1961 with the purpose of providing credit short, medium and long term, to farmers. Over the years emphasis has shifted from short term credit to medium term credit as indicated by a fall in the share of the former in total credit from

70% in 1961/62 to about 30% in 1972/73 [45, p. 12]. The recovery of loan is not satisfactory although apparently the operation of the Krishi Bank is concentrated among well-to-do farmers.²¹

The well-known and much widely discussed Comilla cooperatives were introduced in 1960 under the auspices of the Bangladesh Academy for Rural Development (BARD) with a view to overcome some of the major failings of the traditional cooperative movement. It is based on a two-tier system of cooperatives which included village societies (Krishi Samabay Samity) and Thana Central Cooperative Association (TCCA). The major goal of the Comilla experiment can be summarised as "... a complete reorganization of the social and economic structure of the village" [4, p. 43], one important component of which included the development of "A new cooperative system (of the German Reifessian type) to organize small and medium farmers within the existing agrarian structure in order to safeguard them from large farmers and money lenders to enable them to adopt the new agricultural technology" [23, p. 24]. One important departure from the functioning of the traditional cooperatives was reflected in the Comilla cooperatives' attempted internal savings mobilisation with the ultimate objective of being self-reliant. Therefore, the objectives of the Comilla cooperative system can be interpreted as, (a) increasing output, income and employment, (b) promoting capital accumulation and (c) promoting social and economic equity.

The instruments chosen to achieve the above mentioned objectives included, (a) a network of village cooperatives considered as the basic institution at the grass root level which as mentioned above were federated at the thana level; (b) Thana Training and Development Centre (TTDC) to provide servicing and training facilities and also to coordinate development activities at the thana level and act as a link between the government and other higher level financial institutions on the one hand, and the village societies on the other; (c) The RWP designed to promote infrastructural activities in rural areas and provide additional income and employment to agricultural labourers; (d) The TIP under which farmer groups were to be organized for joint rental and use of irrigation equipment (e.g., pumps, tubewells); (e) The "model" farmer, a member of the village group selected by other members, who receives training at TTDC and in turn serves his own society; (f) Adoption of improved agricultural practices and skills and (g) Obligatory contribution by the members to capital formation and savings through purchase of share of cooperative society (one share of TK. 10 upon becoming a member)

²¹During 1965-71, 50 % of loanees owned 3 to 12.5 acres and accounted for 41 % of bank loan. Recovery rate fell from 51 % in 1962/63 to 21 % in 1972/73 [45, p. 13].

and regular deposits of a specified amount (50 paisa a week). The coverage of the comilla cooperatives was first limited to the Kotwali thana and then it was expanded to other thanas. However, in terms of total coverage among all farming families in Bangladesh, the effort is still at a very modest level although in recent years a sister programme called IRDP has been initiated to expand Comilla type cooperatives all over Bangladesh.

Various studies [4; 6; 19; 23; 27; 48; 49; 52; 53; 57] which evaluated the achievements of the Comilla cooperatives in relation to the stated objectives present a mixed picture. It should be noted that Comilla involved a large investment of human and financial capital which is unlikely to be repeated elsewhere although one hopes that beyond the experimental stage similar results can be obtained at a much lower marginal cost. This puts a big question mark on the prospect of a broad based agricultural and rural development in Bangladesh through the Comilla model of cooperatives. On the basis of available evidence the achievements and failures of the Comilla cooperatives can be summarised as follows.

(a) On the production front it is observed that rice output increased significantly between 1960/61 and 1971/72. Rate of growth of output during post-HYV regime was higher than pre-HYV regime, both again higher than national average. This was brought about by a combination of shift in cropping pattern (in favour of HYV *boro*), increase in irrigation acreage, increased availability and application of modern inputs (fertilizers). It may be added that "surplus" also increased significantly between 1961 and 1972.

(b) Members of cooperatives gained relatively more than the non-members and among members the greatest beneficiary was the large farmer group (owning above 3.33 acres). This can be attributed directly to the differences in the degree of access to HYV technology (seed, fertilizer, water) and credit.

(c) Because of structural reasons, the Comilla cooperatives were unable to help the landless labourers and very small farmers. Movement in money wage rate in Comilla area does not indicate a significant trend upward as compared with other areas, neither is there any evidence of lowering of seasonal variations in money wages.

(d) The record of capital accumulation and repayment has been very poor. The achievement of the objectives of self-reliance has remained a far cry.

(e) Within the cooperative membership, small farmers are apparently under-represented.

(f) Cooperative leadership has been dominated by medium sized better off farmers. Besides, in recent years there has been infiltration from non-full-time farmers, e.g., businessmen and contractors.

(g) Credit operation was found to be dominated (in terms of percentage of total loan taken by any group) by the members of the managing committee who were in turn found to be largest defaulters.

(h) There is some evidence of a reduction in the inequality of income distribution between 1963/64 and 1969/70. But the sample being very small (122) no firm conclusion can be drawn.

Unfortunately, at the present stage of our knowledge, the more important questions about the effect of Comilla cooperatives on modes of production and class structure of the village society can not be answered. Besides, as already mentioned above, it is difficult to extrapolate the achievements and failures of the Comilla experiment to Bangladesh as a whole. The IRDP which draws inspiration from the Comilla programme has been in existence for too short a period for anyone to draw firm conclusions on the future of the new style co-operative movement in Bangladesh. A thought provoking discussion on IRDP in the context of social and economic development of Bangladesh is presented in [4].

Before this section is concluded it would be desirable to make a few observations on the objectives and strategies of rural development as laid down in the First Five Year Plan of Bangladesh particularly as they relate to institution building [2; 9]. According to the Plan the long term objective is "to reduce rural poverty and promote equality of income distribution" [33, p. 87]. The essence of the strategy to achieve this objective is; (i) spread of new technology; (ii) increased representation of small farmers and landless agricultural workers in all credit and cooperative organization; (iii) creation of employment through rural works programme and labour intensive techniques in farming; (iv) withdrawal of subsidies and finally (v) dispersal of rural industries. The two very important missing links are, a drastic land reform and a significant structural change in the existing rural institutions so as to make them more responsive to the needs of the small farmers and landless labourers. On land reform it goes along with the 33 acres ceiling set by the government although it acknowledges that further lowering of the ceiling is desirable. As for institutions, it correctly identifies some of the weaknesses of the earlier institutional policy particularly lack of peoples' participation in the conception and organisation of rural institutions, and recommends that the existing Comilla model should be multiplied through IRDP without any significant modification except what is laid down under (ii) above.

Spread of new technology in the absence of relevant institutional changes particularly in production relations and land ownership, will benefit only the farmers with large holdings, no matter whether or not any significant change in the management of credit and cooperative organizations are brought about along the lines suggested under policy (ii) above. The initiative of adopting new technology and bidding away the inputs at higher prices will always remain with large farmers who will utilise their newly generated surplus either to acquire more land thus displacing small farmers from their land or acquiring interest in industrial and commercial capital.²² Therefore, unless very carefully controlled by the state it will not be surprising if this class also tends to dominate the ownership of small rural based industries and expropriate the surplus created by rural labour in whose interest policy (v) above is being advocated by the planners. The rural works programme and its impact on income and capital formation has been a matter of debate in the past. What is most important to note is that the past programme was foreign aid based and therefore, its viability was always in question. Although the First Plan has been very careful in defining the organization and accountability for funds [33, pp. 164-65] it is not clear where the 50% of the total expenditure under rural works programme which will be provided to ward committees as grant, will come from. Besides the fiscal arrangement for the repayment of the other 50% treated as loan is not very clearly spelled out. In fact, what needs to be emphasized here is that all such programmes must be in the ultimate analysis one hundred per cent self sustaining and appropriate institutional arrangements will have to be made to distribute the benefits from the works programme more equitably. Otherwise, like all other employment generating programmes, its redistributive impact will be negligible.

IV. CONCLUDING REMARKS

The upshot of the above discussion is that promoting social and economic development of Bangladesh must imply ensuring equitable distribution of rural income, which of necessity can not come without equitable distribution of land-holdings and other forms of rural property. In the context of Bangladesh it is important to relate the above to equitable claim on the produce of land and other productive assets. One way to ensure this would be to nationalize all productive assets and then proceed to organize production plans in agriculture and related activities (including rural industries) on the basis of a number of collectives. However, this alternative does not seem feasible within the existing socio-political

²²It follows that policy (iv) i.e., withdrawal of subsidy although a move in the right direction, will bring little or no benefit to the small farmers. Within the framework of the plan a more sensible policy would be to continue a reasonable amount of subsidy to the small farmers and charge a higher than cost price to the large land holders.

environment of Bangladesh. What is perhaps feasible is to introduce a drastic land reform as mentioned before, to be followed by promotion of "advanced" cooperatives [2, pp. 14-17] with the provision of combined use of human and material capital (fixed and circulating).

Formation of production cooperatives is necessary in order to take advantage of the economies of scale implicit in agricultural transformation through introduction of new technology. This is extremely important because the low productivity of agriculture and other rural activities tend to perpetuate poverty in rural areas. Therefore, along with a better distribution of control over means of production steps must be taken to increase productivity. It is quite revealing that during 1973/74 in certain areas of Bangladesh the average size of farm that produced above poverty level income was above 5 acres. There is clear indication that the source of additional income must be increase in productivity, if alternative sources of productive employment cannot be generated. This obviously brings forth the need for emphasizing non-agricultural activities (e.g., small and cottage industry) so as to absorb a portion of the agricultural labour force.

The future of agricultural and rural development of Bangladesh is closely linked with diffusion of new technology, introduction of relevant institutional changes and also with the emerging character and composition of the national and local level leadership. Need for developing appropriate institutions emerge as the key element in the development process. Analysis of the structure of agriculture, and evaluation of past and present policies and institutions do not leave much ground for optimism for the future. In this otherwise generally depressing atmosphere, formation of production cooperatives in the rural areas of Bangladesh should be actively considered. If properly organised such cooperatives may provide a framework which will emancipate the rural poor from exploitation at the hands of feudalist, semi-feudalist and capitalist forces.

It is clear from our discussion in the paper, the success of any cooperative model in improving the living standard of the rural poor will depend upon the realisation of three main objectives which include, increasing the rate of growth of agricultural output, ensuring equitable distribution of output, increasing rate of saving and channelling it into productive investment. It is conceivable that the proposed cooperatives will realise these objectives provided one takes note adequately of the following preconditions.

(i) Cooperative farming and its outcome is closely related to the question of ownership of landholding. In our opinion it will be a waste of time to experiment with alternative models of cooperative farms without directly confronting the issue of land reform.

(ii) The issue of land reform is often side stepped by many on the plea that the Bangalee farmers are much too closely attached to private ownership of land. In reality this attachment has grown out of the need for having a base for obtaining livelihood. If the provision of basic minimum needs could be assured then for a majority of the farmers the question of private ownership of land would not be that important.

(iii) An analysis of the ratio of population and reasources in Bangladesh clearly indicate that no system based on private ownership will be viable for too long in the future. Maximum benefit to maximum number of people can be brought about through collective ownership and use of all resources.

(iv) In order to ensure efficient utilisation of all resources, particularly human resources the cooperative movement must have an ideological basis which will be working towards maximising social welfare (however defined). Institutional changes based on considerations of private profitability often leads to inoptimal use of resources, which clearly a country like Bangladesh can not afford.

(v) There must be a transfer of real power to the people. All decisions at the village and national level must reflect the hopes and aspirations of the people which implies a collective participation by all in the decision making process, particularly at the local level. Needless to say, this has serious implications for the necessary changes in the character of dominant power groups in Bangladesh.

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Farm Size, Efficiency and the Socioeconomics of Land Distribution

by

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I. INTRODUCTION

The question of relative efficiency of different farm sizes is of considerable importance in development theory and in formulating policies of land reform. Associated with this question is that of the economic condition of these peasants who remain landless from any given distribution of land. In this article these questions are examined in the framework of a simple Robinson-Eatwell [1] type production model where land, labour and paddy produce paddy. Peasants are assumed to exchange any surplus of paddy over their own consumption for other commodities at a constant terms of trade, so that real income of the peasants can be measured by the quantity of paddy they produce or earn in the typical tradition of partial equilibrium analysis. The analysis builds up a conceptual framework for examining peasant behaviour that incorporates rising material needs of subsistence as a peasant works more in the field physically, a consideration generally neglected in theories of supply of (manual) labour. Analysis of relative efficiency of different farm sizes that follows takes appropriate note of the cost of peasant labour arising from this and other considerations. The efficiency analysis is done mainly in the context of independent peasant farming (owner-cultivated farming), followed only by some preliminary discussion of the possibilities under joint/collective farming. The question of landless peasants is

* The author is a Professor of Economics at the University of Dacca. Analysis in this article was developed in the course of lectures on micro-economics to first year undergraduates in the University of Dacca in 1974/75. The students, and also colleagues who attended the class, have contributed by raising questions that have sharpened the exposition. The analysis in Section VI was made in response to a question by Professor Brian Reddaway in a seminar given by the author at the Bangladesh Institute of Development Studies where an earlier draft of this paper was presented. The author is also indebted to Messrs Khandker Abdul Wahhab and Zulfiqar Rahman, Lecturers in Economics in the University of Dacca, and to Mr. Abu Abdullah of the BIDS for helpful comments on the earlier draft of the paper. Responsibility for inadequacies that still remain is the author's alone.

thereafter introduced, and the effect of different land distribution patterns on the economic condition of landless peasants in the framework of a competitive market for wage-labour of these peasants is analyzed in some depth.

The efficiency analysis brings out what may be regarded as the analytical essence of the case for small peasant farming in terms of output per land-unit (acre), namely, that the bigger peasant cultivates land less intensively because the marginal cost of peasant labour rises with greater work. This at the same time points to the logical inadequacy of identifying efficiency of farm size with output per acre without consideration for the cost of peasant labour. If, as appears more logical, efficiency is defined in terms of surplus of output over cost of peasant labour, farm sizes both "too small" and "too large" turn out to be inefficient. The analytical property of the farm size that maximizes surplus per acre is then derived, and an approach is suggested for econometric investigation of this farm size. The discussion of the relative merits of joint farming vis-a-vis independent peasant farming that follows highlights the role of cooperative labour in opening up the possibility of improving both the output and the cost functions given appropriate social relations.

The socio-economics of land distribution studied thereafter brings out that under the assumption of constant returns to scale in terms of land and labour, no distribution of land that keeps some peasants landless can yield a competitive wage rate that covers the full cost of labour of these peasants if the land-peasant ratio is less than the surplus-per-acre-maximizing farm size. In this sense and with such land-peasant ratio the landless peasants, if they exist, will necessarily live a "deficit life".

As a by-product, the analysis brings into sharper focus the inadequacy of the conventional growth-of-output ("value-added") approach in development theory which bears little relevance to the actual working conditions of the toiling peasants who form the bulk of the population to whose welfare development theory is purportedly addressed.

II. THE CONCEPTS AND ASSUMPTIONS

Paddy as an input is required both as seed and as working capital to feed the peasants' family during the period of production. The quantity of paddy thus required as input varies with the production plan. This is because given any particular process of production more seed is required to produce more output, and also because the more work a peasant does the greater should be his nutritional

and other material needs (to be conceptualized) for which paddy is needed either for direct consumption or for exchange. This introduces a methodological complication in the analysis which is bypassed by assuming that the peasant has sufficient initial stock of paddy to keep going after meeting his maximum requirement of seed within his range of feasible production options, and any shortfall from his full nutritional and other needs that varies with work may be made good without serious loss of efficiency after he harvests his crop. With this assumption consideration of paddy as an input may be dropped from the analysis. Among other situations, this rules out such acute cases as we observed in Bangladesh during the 1974 famine when peasants have been eating up paddy reserved for seed in their efforts to postpone death by every single day.

Following Robinson and Eatwell, peasant labour is measured in terms of man-years with the assumption that labour is spread over the year in a particular pattern so that work changes proportionately in all crop seasons (transplanting, weeding, harvesting). This abstracts from variation of the intensity of cultivation (labour-land ratio) in some season (e.g., for weeding) independently of intensities in other seasons which is common place in paddy cultivation.

For the formal analysis the production function is assumed to exhibit constant returns to scale, another abstraction from reality in so far as this ignores the effect of cooperation, which can occur between family labours even if it were absent between owners of different holdings. The effect of cooperation in the context of joint farming is discussed towards the end. In addition to constant returns to scale it is assumed that for any given amount of peasant labour there is a finite quantity of land which gives highest output, thus giving an ideal intensity of cultivation. A peasant is naturally assumed to choose the ideal intensity for any amount of work he considers doing as long as sufficient land is available; after the land constraint is hit he has to work more intensively on the same quantity of land if he chooses to work more, and is assumed to face diminishing marginal productivity of labour hereafter.

In considering different amounts of work a peasant should want to consider the corresponding costs. In our model this would be the cost of any of the peasant's own labour. One basic element in this cost should be the expenses needed to maintain the peasant's energy at a normal level. This cost can be conceived as consisting of two components. One, which we shall call the primary cost of peasant labour, consists of the minimum provision required for maintaining a peasant (including his family) in a normal state of health and well-being whether he works or not. While this cost is not directly attributable to work in the field, it

is there (to society in the ultimate analysis) to make the peasant's labour available at all in the first instance. To this should be added the cost of repairing the loss of energy from actual work in the field. This should vary with the amount of work, and should approach and reach infinity as the physical limit of peasant labour is approached and reached.

Other material costs of working in the field would also be there, such as the cost of clothing and the expected medical needs, and some of these would also vary with the quantity of physical work done in the field in sun, rain, mud, and amidst hookworms. These considerations point to the concept of subsistence expenses, which we define as the material costs that have to be met in order to maintain a normal state of health and to repair other material losses (e.g., torn shirt) due to work. It should be obvious that, contrary to the conventional assumption in growth and development theory, subsistence expenses of a peasant should be a rising function of work (at least after some initial amount that may be recommended as part of exercise for normal health) and must approach infinity as the physical limit of labour is approached.

Subsistence thus defined is an analytical concept and should not be interpreted literally. The purpose of this conceptualization is to identify what should logically be regarded as elements of cost (akin to depreciation of an equipment) and not of surplus over cost. A person not meeting all his subsistence requirements does not immediately drop dead, but faces a declining state of health and general material well-being.

To the material needs of subsistence one may want to add the psychological costs of working in the paddy field, to the extent that time is thereby taken away from recreation, social exchanges and such other pleasurable pastimes. The more such time is cut down, the more will a peasant be prone to become irritable in temperament and inclined to beat his wife. Such psychic cost may also be converted in material terms by asking how much extra yield of paddy would compensate the peasant for his loss of psychic well-being due to any given amount of work. The psychic cost of working in the field thus measured also increases with work as a rule, and this too perhaps approaches infinity as the amount of "leisure" available to a peasant approaches zero.

The cost of actual work in the field thus conceived as distinct from the primary cost of peasant labour, will be called the secondary cost of peasant labour. As indicated above this secondary cost varies with the quantity of work actually done, and thus traces a function of labour which we shall call the compensation curve. More precisely, the compensation curve is defined as giving for different quantities

of work and over and above the prime cost of peasant labour, the amount of compensation needed to keep the peasant physically and mentally fresh at appropriate intervals of time over the year.¹ The last provision is added because, just as in modern urban life work schedules are planned so that one is fresh every Monday morning after the weekend outing rather than every single morning, the peasant also has his own time-schedule of work-intensities spread over the crop seasons, and all he may want is to recover from his physical and mental fatigue at appropriate intervals of time rather than every single day.

The compensation curve is assumed to be convex to the labour axis, thus having higher slopes as work increases (O'C in figure 1 drawn with reference to O² as the origin). This may be regarded as a simplifying assumption, and also an assumption that gives sharpness to the analysis and helps derive some basic qualitative results from where the theory of peasant economy may perhaps conveniently start. Empirical legitimacy or verifiability of this assumption will be suggested by the very analysis that follows.

III. COMPARATIVE EFFICIENCY OF SMALL FARMING : OUTPUT OR SURPLUS ?

Imagine two peasants with identical compensation curves and primary costs of labour, but one (small peasant) with farm size k -times ($0 < k < 1$) the other (big peasant). Given output function for the big peasant OQ, that for the small peasant Oq can be derived, by virtue of constant returns to scale, by drawing rays like OA from the origin meeting curve OQ at A, and taking points like 'a' on such rays satisfying the relation $Oa = k \cdot OA$, by virtue of which such points lie on Oq.

Assume each peasant maximizes surplus³ over total costs of his labour as given by the sum of his primary and secondary costs. Let OO' equal primary cost. Total cost of different amounts of labour is then given by ordinates of corresponding

¹Note that the compensation curve is not the conventional indifference curve between income and 'leisure' as it includes also the extra material needs of subsistence that goes with extra manual work (compensation for extra calorie lost, faster depreciation of clothing, and perhaps greater susceptibility to disease).

²In a more general model with non-peasant occupations as options, the compensation curve would also include transfer earnings.

³It is assumed that the peasant gets a positive surplus in some range to maximize. Failing this surplus maximization (deficit minimization) may no longer appear as reasonable an objective as other constraints such as earning a minimum provision for the family may become binding.

of OQ and Oq at A and 'a' respectively. These slopes give the respective marginal products of the corresponding quantities of labour. Note that marginal product of a given amount of labour differs from the corresponding average product of labour by an amount which equals the product of the rate of change of average product of labour at the point concerned and the given amount of labour itself. At point 'a' the total amount of labour in question is k-times that at A, and average products of labour are the same at the two points. As for the rate of change of average product it can be seen by looking at corresponding points 'b' and B respectively on any other ray OB from the origin, that average product of labour at A is changing k-times as fast along curve OQ as that at 'a' along curve Oq, since average products are equal again at B and 'b' while the amount of labour has increased between 'a' and 'b' k-times as that between A and B. Hence the product of the two elements in question is the same at 'a' as it is at A, and hence the corresponding marginal products of labour themselves are equal. In other words, the slope of Oq at 'a' equals that of OQ at A, and hence equals that of the compensation curve at point X.

From diminishing marginal productivity we know that the slope of curve Oq corresponding to amount of labour OL* (which maximizes surplus for big farmer) is less than that at 'a' and hence less than that of curve O'C at point X. From increasing marginal cost we know that the slope of curve O'C at point x corresponding amount of labour k. OL* (given by O1') is less than at X, and hence less than that of curve Oq at 'a'. From this, and from the same respective properties of the two curves again, it is easy to see that the small peasant's surplus is maximized in the interior of the interval (1'L*), say at point 1*. It follows that (a) the surplus-maximizing small peasant works less than the surplus-maximizing big peasant, not because the former is idle by nature, but because the return to him from extra work beyond 1* is lower than the corresponding extra cost; and (b) the small peasant works more intensively than the big peasant and produces more per acre although his average product in terms of labour is lower.

Both (a) and (b) above are common phenomena in agriculture in many countries, and the analysis only provides a sharp theoretical explanation thereof. What is pertinent is that the higher per acre output on the small farm is the result not of output maximization but of surplus maximization under conditions of rising marginal cost of labour. As a matter of fact, either output maximization, or surplus maximization under conditions of constant marginal cost of labour, can easily be shown to yield the same per acre output on both farms (because of constant returns to scale). Thus the observed higher per acre output on smaller farms would on the one hand provide empirical legitimacy to (in the sense of being consistent with) the assumption of rising marginal cost of peasant labour at least within the

range of farm sizes revealing such phenomenon, and bring into question that part of growth and development theory which assumes a fixed level of "subsistence requirements" (per head) irrespective of the amount of labour spent; on the other hand this would indicate that the focus on output per acre itself is misplaced in so far as the peasants themselves seem concerned about the rising marginal cost of labour, and this in its turn brings into question the customary identification of economic development of peasant-dominated societies with growth of (per capita) output in the conventional "value-added" sense that does not take into account the rising marginal cost of peasant labour.

IV. SURPLUS-PER-ACRE-MAXIMIZING FARM SIZE

If we identify efficiency with surplus per acre (over primary and secondary costs of peasant labour) rather than output per acre, the comparison between small and big farm sizes no longer yields results in one direction only. It can be shown

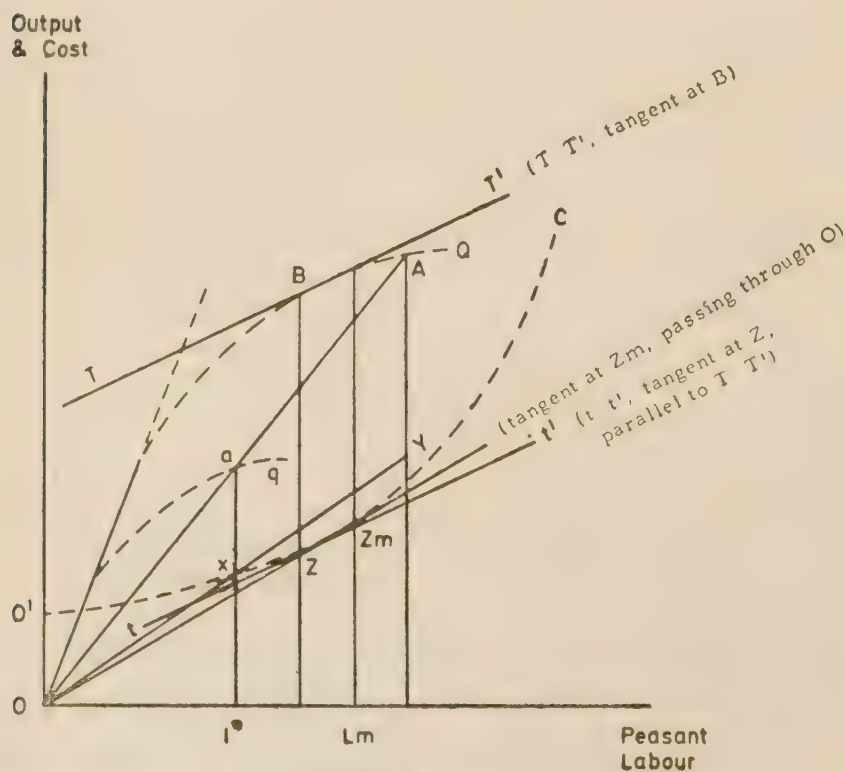


Figure 2

that within the range of farm sizes for which surplus maximizing quantities of labour are less than the quantity of labour OL_m (figure 2) giving minimum average labour cost, larger farm sizes give larger maximum surplus per acre. To see why this happens, imagine two farm sizes one greater than the other in the range of falling average cost of labour, and let $O1^*$ be surplus-maximizing quantity of labour for the smaller farm with slopes at 'a' on Oq , the output curve for the smaller farm, and at x on the compensation curve $O'C$, equal to each other. Extend ray Oa from the origin to meet OQ , output curve for the bigger farm at A . Extend also ray Ox to meet perpendicular from A on labour axis at Y . Because of constant returns to scale outputs at 'a' and A are proportional to farm sizes, and from similar triangles AOY and aOx the distances ax and AY are also hence proportional to farm sizes. Now compare AY with maximum surplus for bigger farm given by BZ , with lines TT' and tt' tangents to OQ and $O'C$ at points B and Z respectively. Because of diminishing marginal productivity A is below TT' . Because of diminishing average cost and increasing marginal cost of labour in the range in question, Z is below line OY , and slope of tt' is less than that of OY . Hence tt' is below OY to the right of Z . It follows that AY is less than the vertical distance between TT' and tt' . In other words, BZ is greater than AY . This proves the proposition.

By similar reasoning it can be shown that for farm sizes which give surplus-maximizing quantities of labour greater than OL_m , larger farm sizes give smaller maximum surplus per acre. It follows that the farm size that maximizes surplus per acre among all farm sizes while for each farm size itself surplus over total cost of labour is maximized, is that one corresponding to which surplus maximizing quantity of labour equals exactly the quantity OL_m where average cost of labour is minimized. As marginal cost of labour for OL_m equals average cost of labour and equals marginal product of labour also, the analytical property of optimum farm size (for interior solution) can be restated as marginal product of labour = marginal cost of labour = average cost of labour = minimum average cost of labour.

The analysis of surplus-per-acre maximizing farm size (henceforth z^*) given above lends itself readily to econometric investigation in areas under simple manual peasant farming where the opportunity cost of non-labour inputs may be neglected,⁵ and peasants are considered to be generally in a state of normal health. The production function can be estimated from cross-farm data postulating a

⁵The possibility of extending the model to include other economic inputs is not ruled out and is left open for further research.

convenient functional form that exhibits constant returns to scale (whether the range of constant or rising marginal productivity of labour is being operative for any farm can be judged from whether farm land is being used fully or not for production). The marginal products of labour for different intensities can therefore be obtained. Assuming peasants maximize surplus over labour costs as defined in this paper, the slopes of the compensation curve (assumed identical for each peasant)⁶ for the respective observed quantities of labour would be obtained from the marginal condition for surplus maximization (i.e., equality of slopes on the output and compensation curves). From this the marginal cost function for peasant labour could be estimated by assuming a convenient functional form for the same, and by integration the compensation curve would be obtained. Primary cost could be estimated from biological and medical knowledge and enquiry into conventions about life style in the area. This might as well differ from peasant to peasant due to variations in factors like the size and composition of families etc., and in that event some central tendency could be taken as a representative.

V. JOINT FARMING

Consider, now, joint farming by 'n' number of peasants on a farm of size 'z'. Imagine joint surplus over the sum of individual labour costs to be maximized. With identical cost curves for labour of each peasant, this obviously requires that any given total amount of labour will be distributed among the peasants so as to minimize the sum of individual labour costs, and this is obviously given by dividing work equally so that marginal cost of labour for each peasant is the same. The aggregate labour cost for any given amount of labour will then be n-times the cost of 1/n-th of that amount of labour, i.e., n-times the amount of labour each individual peasant will give. Ignoring primary costs for the time being so that compensation curves take off from origin O, the aggregate compensation curve OC will then be given by extending rays from the origin drawn on the individual peasant's compensation curve Oo, and then by tracing out the locus of points with distance from the origin along these respective rays n-times the respective distances of corresponding points on Oo (illustrated in figure 3 with $n=3$). By using argument similar to that in figure 1 it can be seen that the slopes of Oo and OC at corresponding points like 1 and 3 respectively are equal.

⁶Valid strictly speaking in situations where the contribution of other members of a peasant's family to production is negligible.

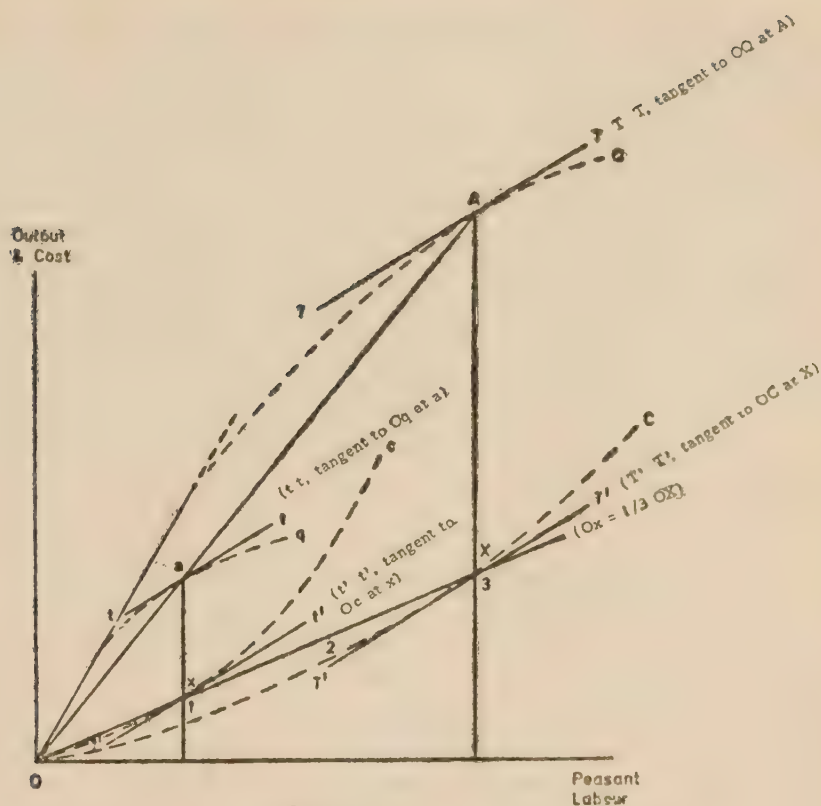


Figure 3

Now draw output curves OQ and Oq corresponding to the original farm size z and farm size z/n respectively, assuming for the time being no effect of cooperation in joint farming so that constant returns to scale prevails irrespective of the mode of operation. Compare efficiency of farm size z under joint farming and of farm size z/n under independent farming by a single peasant. From the relation between the aggregate and individual compensation curves indicated in the previous section it follows that surplus-maximizing solution in the two cases are proportional to farm sizes since slopes at corresponding points (a, x ; A, X) would be equal to each other. Bringing now primary costs into the picture and noting that aggregate primary cost is n -times individual primary cost, the surplus over total costs in the two situations would also be proportional to respective farm sizes.

Thus if constant returns to scale continued to operate even for comparisons between independent and joint farming, the pooling of holdings for joint cultivation and distributing labour efficiently (equally among the peasants) would

under surplus maximization leave both output and surplus per acre unaltered. If however joint farming makes more efficient division of labour (e.g., more accurate and faster linesowing), then output curve OQ would be higher than under independent farming, and surplus per acre under joint farming would be correspondingly higher. It will be all the more higher if cooperation among peasants offsets some of the hardship and irksomeness of labour by stimulating labour socially, enabling integration of work with social culture (social meetings, eating together, etc., in the field, transplanting and harvesting to the tune of music, and so on), as this should lower the (psychic) secondary costs of labour and therefore the compensation curve. Cooperation, and hence joint farming, can thus be an institution that is "twice blessed",⁷ and optimum farm size under joint farming might then be given by organizational limits to the size of cooperative labour rather than by the considerations analyzed earlier. This of course, has implications for "social relations" that is beyond the scope of this article.

VI. LAND DISTRIBUTION AND LANDLESS PEASANTS

So far, the analysis of farm size and efficiency has been done in the context of exclusive peasant farming which presupposes that other occupations can be found for those who cannot be accommodated on land, when farm sizes too large relatively to the number of claimants for land are considered. In particular, the surplus-per-acre-maximizing farm size may itself be too large to accommodate all claimants for land. With sufficient excess demand for labour in non-agricultural occupations this may not be a serious problem. The possibility of taxing part of the agricultural surplus to create employment opportunities outside agriculture may also be there. But such possibilities do not exist everywhere, and cases of excess supply of non-agricultural labour, coupled with political and administrative difficulties of taxing agriculture, are in fact widely observed. This necessitates explicit consideration of the question of those claimants for land (henceforth also to be called 'peasants') who might be left out of land with any given land distribution if exclusive peasant farming only were considered. To this question we now turn.

⁷cf., the Marxist conceptualization of the cost of labour and the goal of socialist transformation of society: the cost of labour is fundamentally conceived as the cost of "labour power", seen as the material cost of maintaining normal productive efficiency (health) of the worker; any other (psychic) cost that may exist is the result of alienation of labour because of inappropriate institutions (social relations). The goal of socialist transformation of society is the elimination of alienation of labour through institutional changes that would bring labour in a co-operative framework, and would seek development of the productive forces through social mobilization of labour that is expected to shift both the production and the cost function favourably.

In order to see the effect of different land distributions on the condition of the landless peasants (if any) in its 'purity', it will be assumed that all peasants, whether they possess land or are landless, have identical cost functions for self-labour. Let Z be the total amount of land available for distribution, and P the size of the peasant population. If z^* exceeds Z/P and if land is to be given to all peasants individually, then obviously farm sizes smaller than z^* have to be considered. Alternatively, various different social relations may be considered to accomodate all peasants on land, such as a combination of peasant farming with wage-labour, joint/collective farming, etc. One question that should be pertinent to ask in considering such alternatives is whether it is possible to give all peasants at least a "break even life", in the sense of meeting the cost of each peasant's labour (the sum of primary and secondary costs) fully so that he lives a life of normal physical and mental health.

In the framework of exclusive peasant farming this would be possible if Z/P at least equals the farm size (to be denoted as z^{**} , with corresponding output function oq^{**}) which just yields zero surplus as the maximum.⁸ With $Z/P < z^{**}$ this condition cannot be met under exclusive peasant farming.

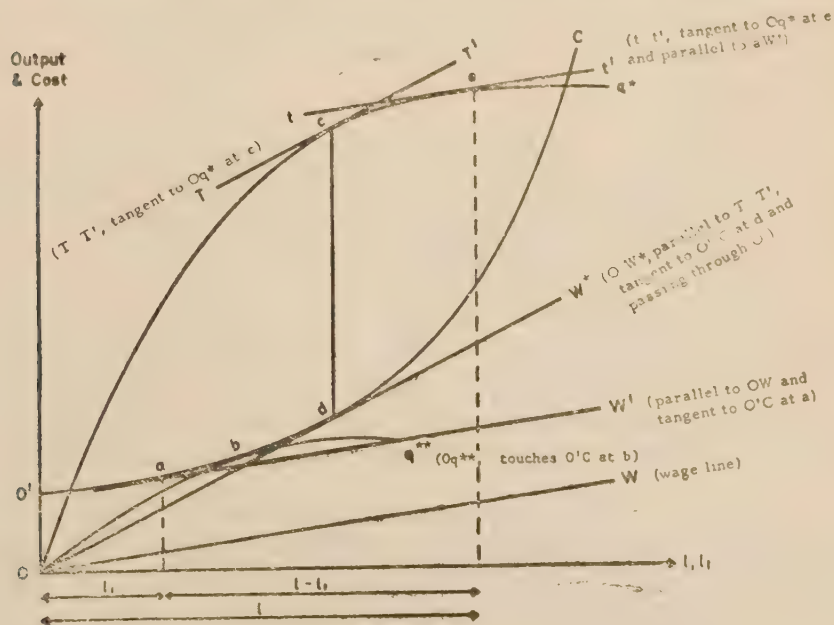


Figure 4

⁸For expositional convenience marginal product of labour is assumed to be falling throughout in this article.

Consider now a combination of peasant farming with wage-labour of landless peasants, and assume that all peasants not owning land, stay on land as landless peasants. It is the principal result of the present enquiry this note that with Z/P less than z^* , no distribution of land whatsoever that keeps some peasants landless can give a surplus (or even break-even) life to these landless peasants within the framework of a competitive market for wage-labour.⁹

Note first that at any given wage rate the demand for wage labour from an individual surplus-maximizing peasant is given by equality between the wage rate, the marginal cost of the farmer's own labour as given by slope of his compensation curve (henceforth marginal cost of 'self-labour') and the marginal product of total labour (1) from his farm, provided the wage rate is not higher than marginal cost of self-labour at the point where the farmer's surplus would be maximized under exclusive peasant farming (no wage-labour will be demanded otherwise). For subsequent reference we shall call this last provision the relevancy condition, which gives a positive or "just zero" demand for wage-labour from the farm concerned. Note also that a landless labourer cannot enter into "surplus life" unless the wage rate is higher than w^* (slope of ray OW^* in figure 4) which enables him just to break even with life. It follows that with all farm sizes less than z^* a surplus or even a break-even life for the landless labourers is not in the cards, for with such farm sizes positive quantities of wage-labour will be demanded only if $w < w^*$.

With farm sizes greater than z^* farmers will individually demand positive quantities of wage-labour for $w > w^*$ as long as w satisfies the relevancy condition. It will be shown that, nevertheless, the market wage rate under competitive conditions will necessarily remain less than w^* if $Z/P < z^*$.

Note that an increase in the farm size, while it may increase the demand for wage-labour at any given wage rate, makes more peasants landless and thereby increases the supply of wage-labour also. Now consider, to begin with, the choice of distributing land equally among a greater or smaller number of peasants. Compare now the market wage rates for any two different such farm sizes.

With farm size z , Z/z number of peasants own land¹⁰ and $(P - Z/z)$ number of peasants are landless. Consider wage rates that satisfy the relevancy condition. Because of identical cost functions for self-labour of all peasants a peasant farmer

⁹It is assumed that supply of wage labour comes only from landless peasants: those who own land do not consider working as wage-labour for reasons of social prestige.

¹⁰ z is assumed to be such as to make Z/z an integer.

will put in the same amount of his own labour at any given wage rate as the quantity of wage-labour a landless labourer will offer, assuming the latter also maximizes surplus (minimizes deficit) over cost of his own labour.¹¹ Call this quantity l_1 .

The quantity $(1-l_1)$ is the individual peasant farmer's demand for wage-labour, a function of the wage rate and the farm size. The aggregate demand for wage-labour to be denoted by $Y(w,z)$ is hence given by $Y=Z/z(1-l_1)$, and the aggregate supply to be denoted by $X(w,z)$, given by $X=(P-Z/z)l_1$.

Consider a bigger farm size $z+\Delta z$,¹² and compare aggregate supply of land demand for wage-labour for the two farm sizes at any given wage rate satisfying the relevancy condition. l_1 does not change, but l , X and Y do. Let these changes be denoted by Δl , ΔX and ΔY respectively. It is easy to see that because of constant returns to scale $(1+\Delta l)/l = (z+\Delta z)/z$, whence $z\Delta l = l\Delta z$.

Comparing now ΔX and ΔY , we have

$$\begin{aligned}\Delta X &= l_1 \left[\left(P - \frac{Z}{z+\Delta z} \right) - \left(P - \frac{Z}{z} \right) \right] \\ &= \frac{Z \cdot l_1 \cdot \Delta z}{z(z+\Delta z)} \quad \text{and} \quad -\end{aligned}$$

$$\begin{aligned}\Delta Y &= \frac{Z}{z+\Delta z} (1+\Delta l - l_1) - \frac{Z}{z} (1-l_1) \\ &= \frac{Z}{z(z+\Delta z)} (z\Delta l - l\Delta z + l_1 \Delta z) \\ &= \frac{l_1 \Delta z}{z(z+\Delta z)} = \Delta X\end{aligned}$$

¹¹For a range of low wage rates a landless peasant may choose to work more than the deficit-minimizing quantity of work simply to earn a minimum provision for his family; this will push the competitive wage rate down further, and thus strengthens the conclusion of this note. For too low wage rates the assumption that landless labourers stay on land may not be valid, but with excess supply in the non-farm sector chances of improving their lives should remain thin.

¹²Also such that $\frac{Z}{z+\Delta z}$ is an integer.

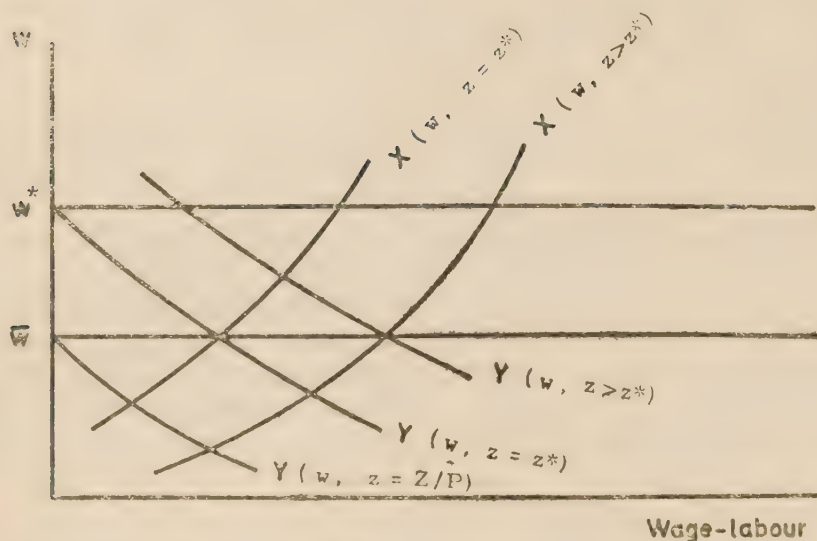


Figure 5

It follows that if w were the equilibrium wage rate (to be denoted henceforth as \bar{w}) for farm size z , it remains the equilibrium wage rate for farm size $z + \Delta z$ also. In other words, equilibrium wage rate is independent of the farm size.

What, then, determines the equilibrium wage rate \bar{w} ? By considering farm sizes successively smaller we eventually come to a finite farm size Z/P which eliminates landless peasantry. With this farm size everyone is a peasant farmer, and works up to the point where the marginal product of labour equals slope of the compensation curve. At a wage rate equal to this slope individual demand for wage-labour is just zero, and hence aggregate demand for wage-labour is also zero; on the other side individual supply of wage-labour would be positive,¹³ but aggregate supply is zero because the number of landless labourers is zero. Thus, this is a limiting case which is part of the analysis of wage-determination in the preceding sections, and yet gives a determinate wage rate equal to the common slope of the output and the compensation functions for farm size Z/P . By virtue of analysis in Section IV the equilibrium wage rate for this farm size must be the same as that for larger farm sizes, and hence a determinate \bar{w} is obtained for

¹³In all situations where marginal product of labour is initially higher than slope of the compensation curve, a necessary condition for production to take place of all.

all farm sizes that give a non-negative size of the class of landless labourers. Being independent of actual farm size, this wage rate is determined then by the land-peasant ratio, technology, and the nature of the cost function for self-labour.

It is now easy to see that \bar{w} thus determined is necessarily less than w^* if $Z/P < z^*$, for then the common slope of the output and compensation functions corresponding to farm size Z/P is necessarily less than w^* . Since the landless labourer needs a wage rate higher than w^* to live a surplus life, he does not, in other words, get a surplus life with $Z/P < z^*$.

The assumption of equal farm sizes may now be relaxed. Take any distribution of land whatsoever amongst Z/z number of peasants, z being any farm size that makes Z/z a positive integer. Aggregate supply of wage-labour at wage rate \bar{w} will be the same for any such distribution as the number of landless peasants remains the same. Because of constant returns to scale, the total demand for labour, including self-labour, from an individual farm will be proportional to farm size at any given wage rate, and hence at the wage rate \bar{w} , for all farms which satisfy the relevancy condition for the given wage rate; thus if the relevancy condition was satisfied for all farms, aggregate total demand for labour, and hence aggregate demand for wage-labour (since each peasant farmer will supply the same amount of self-labour I_1) will be the same as if all peasant farmers had the same amount of land Z/z . On the other hand, if some farm sizes are too small so that the relevancy condition is not satisfied, aggregate demand for wage-labour will be smaller than the above. Thus at wage rate \bar{w} aggregate excess demand for wage-labour can only be zero or negative but not positive under any distribution of land since for equal distribution it is zero at this wage rate by definition. Hence the equilibrium wage-rate for any distribution of land cannot exceed \bar{w} as defined. The implication for the lives of the landless peasants remains unchanged.

To sum up, under any distribution of land that keeps some peasants landless, the equilibrium wage rate for landless labour can at most equal the common slope of the compensation function and the production function for farm size Z/P ; if Z/P is less than z^* then this common slope is less than w^* , and hence the landless peasants would necessarily live a deficit life. The result provides analytical insight into the relative misery of landless peasants in many societies. A strategic assumption that contributes to this result is that of constant returns to scale, for with increasing returns to scale it may be possible to increase aggregate demand for wage-labour by distributing land unequally, making some farms large enough; the latter however by no means guarantees with any given set of parameters of the model that the equilibrium wage rate will actually exceed (or equal)

the break-even wage rate w^* . In situations where at least this break-even wage rate cannot be given to landless labourers, land distribution policy may look for lower farm sizes as a means for offering at least a break-even life to all peasants. But a solution will not lie even in this direction if the land-man ratio is too unfavourable, more precisely, if Z/P is less than z^{**} . The case for exploring the possibilities of socializing the peasantry, through changes in social relations so as to move towards joint/collective farming that could improve both the output and the cost functions as discussed previously, would then naturally arise.¹⁴

REFERENCE

1. Robinson, Joan and Eatwell, John, *An Introduction to Modern Economics*, McGraw Hill, 1973, Book two.

¹⁴The desire to provide all men at least a break-even life may be seen not so much as an objective of development policy as such as a social obligation to meet the costs of human labour, including the primary cost of human life itself which also involves (metabolic) labour necessary to maintain the productive efficiency of "human capital". In other words, this may be regarded as a question of correct cost accounting in development economics. The misleading role of a preoccupation with the conventionally reckoned 'value-added' may be re-emphasized once more in this context. With correct cost accounting a conceptualization of overpopulation suggests itself as an environment where no feasible way exists to pay the cost of human labour as seen above to all members of the population. Overpopulation thus conceived may be seen in a dynamic context as a state of affairs which fails to satisfy the following dual condition : the system must be initially capable, by a reorganization of social relations if necessary, of providing at least a break-even life to all its members, and must furthermore be able to generate a surplus for increasing the productive capacity of the economy so as to retain this ability in relation to a population growing at a stipulated rate. This opens up avenues for further research that will hopefully be undertaken subsequently.

Income Inequality and Land Redistribution in Morocco

by

KEITH B. GRIFFIN*

I. THE GROWTH OF INEQUALITY

The material well being of the majority of the population of Morocco is heavily dependent upon the rate of growth and distribution of income within the agricultural sector. Nearly two-thirds of the population, viz., 65 per cent, is located in rural areas and over half the employed labour force, viz., 57 per cent, depends directly on farming and livestock for a livelihood. These figures, large as they are, understate the extent to which the poorest members of the community, say, the bottom 40 per cent of the income distribution, are concentrated in agriculture. Information on income distribution is fragmentary, but it seems likely that four-fifths of the lowest four deciles would be found in rural areas.

We know, for example, that agriculture, forestry and fishing account for less than a third of the national income, i.e., substantially less than the proportion of the labour force engaged in these activities. Indeed, the average productivity of labour in the non-agricultural sector is 3 or 4 times as large as that in agriculture. These averages suggest that the disparity in income between agriculture and the rest of the economy must be considerable, and of course within each of these broad sectors income is far from equally distributed. We know also that average consumption per head in urban areas is 2.2 times that in rural areas. Finally, we know that consumption of the 10 per cent richest households accounts for 37 per cent of total consumption, while the bottom 10 per cent of households accounts for a derisory 1.24 per cent. Evidently, the problem of income distribution in Morocco is acute.

More alarming still is the near certainty that inequality has increased rapidly in recent years. During the last 11 years the disparity between levels of consumption in the urban and rural areas has risen from 70 per cent to 120 per cent. Similarly, over the same period, the share of the rich in total consumption has increased from 25 to 37 per cent while that of the poor has fallen from 3.3 to 1.24 per cent [2, p. 3].

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Similar tendencies appear to have been at work within the agricultural sector. The area under cultivation has grown slowly and the number of livestock has remained roughly constant, yet the number of people engaged in farming and animal husbandry has increased steadily. As a result, the average size of holding has fallen. In addition, fragmentation of holdings has become accentuated. Within the irrigated areas, however, land concentration may actually have increased. A study of the Rharb Plain from 1965 to 1970 showed land in modern Moroccan owned farms increasing from 6 per cent of the total to 25 per cent. The average size of farm in this category increased from 200 hectares to 260 [10]. Apparently, much of this land was acquired from foreign landowners, but the author also notes that the proportion of landless workers increased from 16 to 33 per cent in the same period.

There has been little or no tendency for agricultural output per head to rise. Indeed, between 1957 and 1967 there was a clear tendency for it to fall. Since then the situation appears on the surface to have improved somewhat, largely as a consequence of a series of exceptionally good harvests beginning in 1968. Part of the apparently good performance, however, may be statistical illusion.¹ Even so, reported per capita agricultural output in 1971 was only fractionally higher than in 1961.

In reality the situation is probably more severe than these figures suggest. Fragmentary evidence from a variety of sources indicates that the real income of the poor has been falling, at least throughout the decade of the 1960's. One way of checking this hypothesis is to examine the consumption per head of wage goods, i. e., of items which form an important component of the consumption pattern of the poor. If it is found that per capita consumption of some of these items is falling in a period when aggregate per capita income is rising either (i) the aggregate figures are wrong or (ii) the goods are inferior, i. e., have a negative income elasticity of demand, or (iii) income inequality has increased so fast that the poor have become absolutely as well as relatively worse off.

One study indicates that the per capita consumption of cloth fell from 3.0 kg. in 1963 to 2.5 kg. in 1969 [8]. Another shows that per capita consumption of sugar also declined in this period [3]. A third demonstrates that meat consumption per head in rural areas fell from 12.6 kg. a year in 1960 to 11.3 kg. in 1969 [4, p.6]. Since none of these products are inferior goods, there is a strong implication

¹Reported agricultural output follows a curious pattern. Between 1964 and 1967 output was stagnant at about 3,000 million DH (in 1960 prices). Between 1967 and 1968 output suddenly increased by 29.6 per cent. From then onwards to 1972 it became stagnant again at about 3,900 million DH a year. It may be that an upward revision in the area estimates and yields accounts for the abrupt discontinuity in the production series.

that the standard of living of some people is falling. This impression is further supported by the fact that the proportion of the cereal harvest that enters the market has been declining steadily.

Another piece of supporting evidence is that the productivity of labour in the livestock sector has declined steadily since 1961. This is of considerable significance because perhaps as much as 60 per cent of the rural population, i.e., 5-7 million people, depends entirely or mainly on livestock production, and the number of animals they possess is equivalent to 1-2 beef cattle per person. The herds are growing less rapidly than the dependent population and the average weight of slaughtered animals also is falling. Between 1967/68 and 1971/72 the sheep herd per capita declined 0.74 per cent a year, the cattle herd increased zero per cent and the goat herd per capita declined 8.2 per cent a year. It is quite possible therefore that the standard of living of perhaps the majority of the rural population has been falling.

Comparison of the 1959/60 consumer expenditure survey with that conducted in 1970/71 indicates that the bottom 40 per cent of the rural population and at least the bottom 20 per cent of the urban population suffered a fall in their level of consumption.

TABLE I

**PERCENTAGE CHANGE IN REAL HOUSEHOLD CONSUMPTION
1959/60 to 1970/71**

All Income Groups	81.9
Urban	105.5
Rural	50.3
Lowest 40 Per cent	-0.2
Urban	14.3
Rural	-10.5
Lowest 20 Per cent	-24.2
Urban	-8.8
Rural	-31.5

Source : Compiled from 1959/60 and 1970/71 consumer expenditure surveys.

The data in Table I have to be interpreted with a little caution, however. First, the 1970/71 survey, unlike the previous survey, includes "foreigners and Israelites",

a group which accounted for about one per cent of the total population. Assuming "foreigners and Israelites" were more prosperous than the average, their inclusion in the most recent survey leads to a slight overestimation of consumption in 1970/71, both on average and in each decile category. Thus the figures in the table tend to overstate slightly the rise in real consumption or understate the fall in consumption, as the case may be.

Second, the survey data are published in terms of current prices. In order to estimate the change in real consumption (in 1959/60 prices) nominal values have had to be deflated. To do this we have used the Casablanca cost of living index, which showed a rise in consumer prices of 35 per cent in the period covered in the two household surveys. This index is likely to be reasonably satisfactory for deflating urban consumption, but it may not be accurate when used to convert current prices in rural areas to constant values. In particular, the fall in real consumption of the bottom 40 per cent in rural areas may be exaggerated if country folk spend a relatively large proportion of their income on items which have increased relatively slightly in price. Inspection of the components of the cost of living index does not suggest this is a great danger, however. The price of food and clothing, to which the poor rural inhabitants can be expected to devote a large part of their consumption, rose faster than the index as a whole, whereas the price of housing and "other" items, which probably are more important in urban areas, rose less rapidly than the index as a whole. Thus, if anything, prices may have risen more rapidly in rural areas than in the cities.

Certainly all the evidence available is consistent with the proposition that a very large section of the rural community is sinking ever deeper into poverty.

This belief is strengthened when one considers the pattern of capital formation within the agricultural sector. Agricultural investment, both during the colonial era and since independence, has been concentrated on large dams intended to irrigate the best lands. Dry farming, livestock and small scale irrigation facilities have been woefully neglected. In the last five year plan, covering the period 1968-72, the central budget allocated 45 per cent of its development expenditure to agriculture, and nearly 60 per cent of this amount was scheduled for investment in dams and the development of the irrigated areas. In practice, approximately 67 per cent of central government investment in agriculture was located in the irrigated zones, in part because expenditure on large dams was larger than originally foreseen and in part because the difference between planned and actual expenditure was greater in the dry zone, i.e., the 'bour', than in the irrigated zones.

Thus, most of the growth in agricultural production has occurred in the irrigated areas. Production in the 'bour' has been stagnant and it is probable that the standard of living of the people in this area has continued to decline.

II. THE PLANNERS' RESPONSE

Allocation of Development Expenditure

The government is well aware of the problem of inequality and among the objectives to be achieved in the next five years under the plan, a better distribution ranks high. Furthermore, several of the subsidiary objectives would appear to contribute towards greater equality: a concern to increase employment opportunities, a wish to develop industries which can compete in international markets (and which, presumably, therefore would be labour intensive), and a decision to continue to give high priority to agriculture. In general terms there is no doubt that income inequality has been recognized officially and the plan has expressed a determination to reduce it.² The issue that needs to be explored is whether the distributive objective of the plan can be achieved with the means devoted to it.

The five year plan for 1973-77 is essentially a schedule for public sector investment allocation and phasing. The degree of aggregation is high—and it is virtually impossible to separate the impoverished 'bour' from the relatively prosperous irrigated areas. The next difficulty is that government policies other than investment are mentioned only in passing. Fiscal policy, price policy and interest rate policy, for instance, receive little attention, yet they obviously will effect the behaviour of the economy and the distribution of income. Finally, the link between capital formation in a particular activity and the resulting flow of output is hard to detect. One cannot always be certain, for example, that an activity which receives high priority for investment will experience a high planned rate of growth of production.

Despite these inconveniences it is possible to begin to assess the likely impact of the plan on the distribution of income by examining the level and composition of planned agricultural investment. The basic data are presented in Table II.

²In fact precise targets have been established for the rate of growth of consumption per head for various income groups. Households with an average level of consumption in excess of 13,000 DH per annum are projected to experience no increase in their income; households consuming 3,300 DH per year should experience a growth of income of 3.8 per cent a year, while households between these limits should experience a growth of 1 per cent a year. (Note that at the time of writing i.e., September 1973, the exchange rate was \$ 1 U.S.=3.92 dirham.)

TABLE II
PLANNED DEVELOPMENT EXPENDITURE, 1973-77

	DH millions	%
1. Total Planned Development Expenditure	26,283	100
2. Of Which, Agriculture (including dams)	4,761	18.1
3. Of Which, Expenditure in		
(a) Irrigated Areas	2,561	9.7
(b) Dry Farming Areas ('bour')	2,200	8.4

Source : Table compiled by myself and Jacques Argoullon from information contained in the Plan.

Development expenditure in the agricultural sector has been defined as expenditure on crop and livestock production, dams and other irrigation facilities, the rural public works scheme (promotion nationale) and supporting services, of which agricultural research is the largest. In addition, estimates of private investment have been included, whether financed by individual savings or credit from the banking system. Our estimate exceeds that of the plan, which classifies investment in large dams under infrastructure.

It appears from the table that the proportion of investment expenditure allocated to agriculture is smaller than the proportion of national income generated within the sector. More significant, perhaps, is the fact that the allocation to agriculture is only half that of industry. Given that the people engaged in agriculture are considerably poorer and far more numerous than those engaged in industry, it is improbable that the planned pattern of development expenditure is consistent with the distributive objective.

Let us now consider the pattern of development expenditure within the agricultural sector. The data presented in the plan are not sufficiently detailed to enable one to make an exact allocation between expenditure destined for crop and livestock expansion in the 'bour' and that destined for the irrigated areas. A rough approximation, however, is possible.

Our estimates indicate that about 54 per cent of all development expenditure in agriculture is scheduled to occur in the irrigated areas; at most, 46 per cent will be located in the 'bour'. These percentages should be compared with the distribution of the population, land and output between the two sectors. Unfortunately, the agricultural statistics of Morocco are not organized in such a way as to permit this comparison, so we have been forced to compile our own crude "guesstimates". These are presented in Table III.

TABLE III

DISTRIBUTION OF LAND, LABOUR AND OUTPUT BETWEEN THE
'BOUR' AND THE 'MODERN' AGRICULTURAL AREAS

	(percentages)	
	The 'Bour'	'Modern' Areas
Output	68	32
Land	87	13
Labour	72	28

The 'modern' agricultural areas have been defined to include the irrigated zones, vineyards, orchards and mechanized cereal farms. These 'modern' areas, therefore, include more land and labour than is contained in the irrigated areas of Table I. That is, the information in Tables I and II does not pertain to precisely the same concepts. They are sufficiently similar, however, to make comparisons instructive.

The great majority of the agricultural labour force is occupied in the 'bour'. Crop cultivation is dependent on rainfall, and a simple rotation system of cereals followed by fallow is common. A large proportion of value added in the 'bour' is derived from extensive grazing of livestock.³ Superficially, the land-labour ratio appears more favourable in the 'bour' than in the mechanized and irrigated areas, but the average quality of the land is, of course, much inferior. Nonetheless, value added per worker is only about 20 per cent higher in the 'modern' areas than in the 'bour'. The superiority of the former lies in the fact that value added per hectare is 3 times higher than in the 'bour'.

The intention of the planners is to channel about 54 per cent of agricultural development expenditure into the irrigated areas and only 46 per cent into the 'bour'. The implication of this strategy is that investment per worker will be at least 3 times higher in the relatively more prosperous rural areas than in the 'bour'. In other words, the investment strategy of the plan, if implemented, would aggravate rural inequality, not reduce it. It is true that the planned allocation of expenditure is less heavily biased against the 'bour' in the 1973-77 plan than in the previous one, but a bias is still present, and it is not insignificant. The best that can be said is that the plan envisages a reduction in the rate of increase of inequality, but not in the degree of inequality.

³Livestock accounts for about a third of total agricultural production, most of which is generated in the 'bour'.

There can, of course, be enormous discrepancies between what is planned and what actually occurs. This is especially likely to be true in Morocco where the Planning Secretariat has little responsibility for plan implementation and where, in any case, major economic decisions are made by the King and can be changed at any time at his discretion.

Expenditure in the irrigated areas is likely to be higher than the amount announced in the plan. This is likely in part because of the King's decision and in part because the government has demonstrated its capability of completing an investment programme in irrigated areas: actual expenditure on dams plus development in the irrigated areas in the 1968-72 plan was 103 per cent of the target.

The situation is quite different in the 'bour'. Development expenditure on crop and livestock production in the dry zones was only 76 per cent as large as was anticipated in the 1968-72 plan. The shortfall was particularly great in cattle production, where only 71.5 per cent of the target was achieved. Despite the difficulties encountered during the last planning period in implementing programmes in the dry zones, the new plan has sharply increased the amounts to be spent. It is unlikely that the target will be achieved. That is, actual expenditure in the 'bour' is likely to be significantly lower than planned expenditure. The implications of this are unpleasant to those who wish to stop the rise in poverty and improve the distribution of income in rural areas.

Planned Growth Rates

One way of checking the previous analysis is to examine whether the allocation of development expenditure is roughly consistent with planned rates of growth. The agricultural sector as a whole is planned to expand at an annual rate of 3.6 per cent. This is slightly in excess of a rate of growth of population of 2.9—3.1 per cent per annum.

Within the agricultural sector, livestock production is planned to grow 3 per cent a year, i.e., at the same rate as the population. Crop output is expected to increase at an annual rate of 4 per cent. Not all crops will expand at the same pace, however. Indeed it seems that crops produced largely in the 'bour' will increase much more slowly than those produced in the irrigated and mechanized areas. Thus industrial crops (e.g., cotton and sugarbeet) are projected to grow 5.1 per cent a year; citrus other fruits and vegetables, 3.6 per cent; cereals, tobacco and grapes only 1.9 per cent a year.

That is, the two activities which predominate in the 'bour'—livestock and cereals—are planned to have a combined rate of growth which is less than that of

the population. Since the mass of the poor are located in the 'bour', this pattern of growth seems inconsistent with a policy of redistributing income. In fact, it is possible that the standard of consumption of the poor may continue to decline absolutely.⁴

Projections of employment in rural areas are equally discouraging. Employment in livestock raising is assumed to increase 3 per cent a year, implying a zero rate of growth of productivity in that activity. Employment in crop cultivation is projected to increase 0.5 per cent a year. This reflects a relatively high expected rate of growth of the productivity of labour, viz., 3.5 per cent. This rapid growth in output per worker, in turn, reflects increased capital intensity in the small part of the agricultural sector in which most of the growth will occur.

Employment in the sector as a whole is expected to grow about 1 per cent a year, while productivity is planned to increase 2.6 per cent a year. Most of the increase in employment, however, will be confined to the 'bour', while most of the increase in productivity will occur in the more privileged areas. At the end of the five year plan the 'bour' will contain not only more people absolutely, but a larger proportion of the rural population as well. Inequality is certain to increase and the level of poverty is highly likely to do so.

III. THE CASE FOR LAND REFORM

We have argued so far that investment in the 'bour' is likely to be lower than planned, and that in any case, the projected growth of output and employment is insufficient to prevent a further deterioration in the distribution of income and in the level of living as well. These tendencies are unlikely to be reversed by price policies; indeed, if present policies of subsidizing non-labour inputs continue, they may accentuate them. The inevitable conclusion is that virtually the only way of significantly improving the distribution of income in rural areas within a relatively short period of five years is by redistributing the stock of wealth, i.e., essentially, land. The extent to which this is possible, however, depends upon the present distribution of holdings.

At present it appears that the state owns 9 or 10 million hectares. Perhaps 4 million of this is forest and an equal amount is rangeland. Between 1 and 2

⁴Sample surveys indicate that in 1973 rural households devoted 61.7 per cent of their income to food. The poorest families within rural areas would spend proportionately even more, of course. Thus a decline in food production per head among semi-subsistence farmers is likely to be associated with a fall in their standard of living.

million ha. is cultivated 'bour' and about 300,000 ha. is on 'modern' farms recovered from Europeans. Collective (tribal) land is of considerable importance—perhaps 6 or 7 million ha. Most of this is rangeland but perhaps as much as 1 million ha. is cultivated 'bour', half of which is fallow. Habous, i.e., land owned by religious institutions, is of little significance. There may be 200,000 ha., all of which is cultivated 'bour'. Privately owned land (melk) represents about 8 million ha. This would be divided roughly as follows: forest, 1 million hectares; rangeland, 1-1.5 million, cultivated 'bour', 3-4 million, and cultivated 'modern' farms, 1-3 million ha.

The table below contains data on the distribution of melk land owned by Moroccans in the early 1960's. The data are somewhat out of date now, but they can still be used to obtain a general impression of the structure of ownership. It should be noted, however, that land then owned by foreigners is excluded from the table, as is tribal and habous land. Fallow land also is excluded, and this may imply that the extent of inequality is understated if, as we suspect, the proportion of land in fallow tends to rise with the size of holding. The greatest problem which arises in trying to interpret the figures in the table, however, is that no distinction is made between irrigated land and dry land. One hectare of irrigated land is equivalent to several, i.e., 3 or 4 hectares of 'bour'. Thus if it were found that most small farms are in irrigated areas and most large farms are in the 'bour', the data in Table IV would greatly exaggerate the degree of inequality. We shall try to show below, however, that this problem does not in fact arise.

TABLE IV
DISTRIBUTION OF MELK LAND, EARLY 1960'S

Size of Holding (ha.)	Households (%)	Cultivated Area (%)
Landless	21	0
Less than 2 ha.	48	16
2-4	15	19
4-10	12	32
10-20	3	17
More than 20 ha.	1	16
	100	100

Source : Calculated from data supplied by the Government of Morocco, Secretariat D'Etat au Plan.

The data in Table IV indicate that 69 per cent of rural households either own no land or less than 2 ha. This group accounts for only 16 per cent of the melk land actually cultivated. At the other extreme, 4 per cent of the households own 33 per cent of the land. By any standards this is a very uneven distribution of landed property. The mean size of holding is slightly less than 3 ha. and the mode is between zero and 2 ha. The average size of holding of the top 4 per cent is 20.2 ha., i.e., more than ten times the mode.

As a first approximation one might imagine a land reform designed to give the landless enough land to put them in the modal category of landowners. This could be achieved by redistributing a little more than half of the land possessed by those with more than 9 ha. and giving 2 ha. to each landless family. This would involve a transfer of 18 per cent of the land and benefit 21 per cent of the rural population.

The distribution of land after such a reform would be roughly as follows :

Size of Holding (ha.)	Households (%)	Cultivated Area (%)
0.1—4	84	53
4—9	12	32
9—10	4	15

This could be achieved by imposing a ceiling of 9.5 or 10 ha. on the amount of land a family could own. Whether such a programme is feasible, however, requires further analysis.

It is sometimes argued that holdings in the 'bour' are larger than in the irrigated areas because more land is required to maintain a family at subsistence level using dry farming techniques than with irrigation. Thus, it is claimed, a land redistribution programme should plan on distributing larger holdings in the 'bour' than in the irrigation perimeters. The available evidence, however, does not entirely support the initial assumption.

There are no official statistics on land distribution in the 'bour' so we are forced to rely on unofficial sources. One important study of Moroccan owned melk land located in the 'bour', published in 1964, suggests that the distribution of land in the dry zones is remarkably similar to the overall pattern reported in the

previous table [1]. One third of the rural population of the 'bour' is landless—i.e., a larger proportion than in the agricultural sector as a whole—and 74 per cent of the households have between zero and 2 ha. This group accounts for 16 per cent of the land. The modal size of holding is zero hectares—many of these people must be impoverished herdsmen—and the mean is 2.5 ha., i.e., about 0.5 hectares less than the national average.

Broadly similar results are obtained from surveys of small localities. For example, in the Abda Doukkala project area, 9.5 per cent of Moroccan landowners with 10 ha. or more accounted for 50.5 per cent of the land [7, pp.4-9]. Again, a study of 8,470 Moroccan rural families in a dry farming region near Meknes indicated that 63 per cent of the households were landless and another 16.3 per cent had less than 2 ha. At the other extreme, 5.6 per cent of the households with more than 10 ha. possessed 76 per cent of the land.⁵

The case for a land reform is that it is probably the only way mass rural poverty can be reduced quickly. In the process, of course, a redistribution of land would reduce inequality. It might also reduce some of the social tensions in the country, although it certainly would accentuate others.

If well managed, a reform might result in higher agricultural output, after a transition period, since evidence from many other countries shows that value added per hectare is inversely related to farm size. Relevant information for Morocco is scarce, but there does seem to be a consensus that output of animal products per hectare does rise as size of farm falls. In addition, evidence from the Gharb Plain shows that, on a crop by crop comparison, value added tends to be higher on family farms than on large mechanized holdings. This tendency normally would be reinforced by smaller farms selecting a cropping pattern based in favour of high value added products, but there is no evidence on this issue for Morocco.

⁵See the F.A.O. report on the Meknes project.

TABLE V

VALUE ADDED PER HECTARE ON FAMILY FARMS AND LARGE MECHANIZED HOLDINGS IN THE GHARB PLAIN

Crop	Family Farms	(dirhams)
		Large Mechanized Holdings
Dry Farming		
Wheat	347	323
Beans	472	430
Sugarbeet	837	1045
Sunflowers	600.5	405
Chic Pes	487	405
Irrigated Crops		
Sugarcane	2565	3115
Cotton	1130	n.a.
Rice	n.a.	735
Market Gardening (average)	1542	n.a.
Citrus Fruit	n.a.	2460

Note : The source does not indicate the average size of farm in each category.

Source : Office Regional de Mise an Valeur Agricole du Gharb, typescript, 1973.

There is widespread agreement, although again data are scarce, that small farms use labour more intensively than large. This opinion is strongly supported by information collected in the Gharb Plain. See Table VI.

TABLE VI

DAYS WORKED PER HA. ON FAMILY FARMS AND LARGE MECHANIZED HOLDINGS IN THE GHARB PLAIN

Crop	Family Farm	Large Mechanized Farms
Dry Farming		
Wheat	45	10
Beans	30	20
Sugarbeet	80	60
Sunflowers	40	20
Chic Peas	25	20
Irrigated Crops		
Sugarcane	155	155
Cotton	150	n.a.
Rice	n.a.	40
Market Gardening	115	n.a.
Citrus Fruit	n.a.	73

Source : Office Regional de Mise en Valeur Agricole du Gharb, typescript, 1973.

Again, the data in Table VI probably understate the differences between small farms and large because the former would tend to select a cropping pattern which is more labour intensive than that selected by mechanized estates. If this analysis is correct it implies that a redistribution of land would create employment opportunities, absorb some of the underutilized family labour and, by reducing the attractiveness of working on commercial farms, raise the real wages of such landless labourers as remain. The benefits, thus, might be multiple and the costs negligible and temporary.

IV. CREEPING REFORMISM, 1956-72

The government of Morocco has been slow to recognize that an agrarian reform could make a major contribution to raising the material well-being of the majority of the population, but some progress has been achieved and the pace of reform may be accelerating. The first step was taken during the first decade after independence was achieved in 1956 when some state owned land and some of the collective land recovered from the colonists was distributed to Moroccan farmers. Most of this land was in irrigated areas and the average size of plot was quite large, viz., about 9 ha. Between 1956 and 1966 about 20,000 ha. was distributed under this programme.

A second step was taken on 28 September 1963 when the government announced that it would recover the "lots de colonisation". At the same time it required prior government approval for the sale by foreigners of any other land they occupied, and hinted that privately owned (melk) land would eventually be expropriated.

The "lots de colonisation" comprised about 226,000 ha. This land originally was owned collectively but was taken over under the French Protectorate and awarded to foreign settlers, usually French, for their use. The 1963 dahir (royal decree) transferred the "lots" to the state. The government took the view that the settlers had no legitimate property rights in this land and therefore no compensation was due; expropriated assets other than land, however, were eligible for compensation.

Most of the "lots de colonisation" were recovered in three phases stretching over three years. Each phase was larger than the one before and each appeared to be centred on a different region. In October 1963 the programme began with the recovery of 48,783 ha. largely in Kenitra and Rabat provinces. In August 1964, after the harvest, 69,511 ha. were acquired, much of it located near Fes.

Then a final phase in August 1965, almost as large as the first two combined, recovered 105,050 ha. A large part of this land was located in Casablanca and Meknes provinces.

An Agricultural Management Company (SOGEA) was established by the Ministry of Agriculture to look after the quarter of a million hectares newly acquired by the state plus some additional land already owned by the state. In 1966 the area under state farms was approximately equal to 242,300 ha. and was distributed as follows :

Annual Crops	157,000
Pastures	18,500
Vineyards	14,800
Citrus Plantations	10,900
Other Crops	9,700
Non-agricultural Land	31,400

It soon became clear that the farm management and tenure systems in Morocco were unsatisfactory. Two major problems emerged. First, the state farms were inefficient and badly managed. Their equipment was inadequate, labour was poorly utilized and the directors lacked sufficient technical knowledge and experience to run a large agricultural operation. Second, many of the remaining foreign owned farms also were not being farmed efficiently. Insecurity of tenure, i.e., the fear of expropriation, had discouraged investment and induced farmers to adopt an extensive system of cultivation.

Several steps were taken in an attempt to solve the first problem. On 4 July 1966 an Agrarian Reform Law was passed and the government adopted a policy of distributing to private farmers most of the land then cultivated in state farms. Next, in 1970, in an effort to decentralize the administration of the remaining state farms, SOGEA's land was turned over to the Ministry of the Interior and the Provincial Assemblies. Lastly, in 1972, a new state company was formed to manage the residual land owned by the state : SODEA (*Société de développement agricole*). Most of the approximately 25,000 ha. entrusted to SODEA consisted of the plantations which the government decided not to distribute to individual private farmers.

The keystone of the new policy was the 1966 law. This provided for the division of the state farms under annual crops and their sale to suitably qualified applicants. Those eligible for consideration had to jump several hurdles. They had to be (i) citizens of Morocco, (ii) members of a specific ethnic or tribal

group designated to be beneficiaries in a particular locality, (iii) a member by birth or residence for 5 years of the rural commune where the land distribution was to occur, (iv) morally upright, (v) physically strong, (vi) less than 45 years of age, (vii) cultivators or farm labourers and, finally (viii) either totally landless or owners of very small plots which would be turned over to the state in part exchange for the land to be received.

It was decided to give each beneficiary enough land to provide him with an income of 3,500 to 4,000 DH a year. Thus the size of each allotment varied from one area to another depending on the quality of the soil and whether or not the land was irrigated. In general, the typical size of plots distributed in irrigated areas was 5-8 ha. and in the 'bour', 10-25 ha. These farm sizes should be compared with the average distribution reported in Table IV. It is evident from the table that the farms distributed were far larger than the national average. Indeed farms of the size distributed would place their owners in the top 15 per cent of rural households. In other words, the effect of the reform was to create a slightly larger upper middle class in rural areas.

This conclusion can be confirmed by comparing the average income of agricultural households with the target income of the reform programme. There are approximately 2 million agricultural households and, according to the national accounts, primary sector output (including fishing, unfortunately) is about 4,000 million DH. Thus average household output is roughly 2,000 DH a year.⁶ This is only about half the target income of 3,500-4,000 DH of the programme. Since the mean income in rural areas is substantially larger than the median or the mode, the target income of the land reform beneficiaries, if achieved, would almost certainly put them in the top two deciles of the rural income distribution. We shall see below that in fact the target was exceeded.

Some observers report that the land was sold to the selected beneficiaries in the dry areas at about 1,600 DH per ha., and this is regarded by them as approximating a commercial price [9, p.9]. Field observations in the region around

⁶The national accounts are not consistent with results obtained from household surveys of consumption [5, p. 29]. The latter indicate that annual consumption per household in 1970/71 was as follows :

Farm cultivators :	4,596 DH
Agricultural labourers:	3,000 DH
Industrial workers :	6,745 DH

The survey, however, probably includes a series of biases which tend to inflate household consumption.

Settat, however, suggest that the commercial price of dry land was 4,000 to 5,000 DH per ha., whereas the price at which land was sold by the state to members of a cooperative was 2,000 DH per ha. Repayment is over 20 years (two years grace followed by 18 equal annual installments is the normal arrangement) and the interest rate is 4 per cent. Payment usually is in cash, but cases have been found of payment in kind, namely, in wheat.

The terms of repayment are the same in the irrigated areas and the price is equally heavily subsidized. For example, in one area visited (the Sebou basin) the value of the land equipped for irrigation was estimated to be about 8,000 DH per ha., yet the sales price was only 4,000 DH. When account is taken of the generous repayment terms, this means that the subsidy to the beneficiary was greater than 50 per cent.

TABLE VII
LAND REDISTRIBUTION, 1957-72

Year	Land Redistributed (ha.)	Number of Beneficiaries	Average Size of Holding (ha.)	Number of Cooperatives Established	Households per Cooperative	Average Size of Cooperative (ha.)
1957-60	11,827	1,262	9.37			
1964	2,560	355	7.21			
1966	5,666	691	8.19	30	23.0	188.9
1967	2,964	443	6.69	15	29.5	197.6
1969	16,949	1,471	11.52	48	30.6	353.1
1970	19,016	1,213	15.68	45	27.0	422.6
1971	31,355	1,864	16.82	70	26.6	447.9
1972	90,857	3,802	21.27	140	27.2	649.0
Total	181,194	11,101	16.32	348	27.2	479.3

Source : Ministry of Agriculture and Agrarian Reform.

Table VII contains basic information on the speed with which land redistribution was accomplished. Progress was very slow until 1969. In fact there were several years in the first dozen years after independence when no land at all was redistributed. There was an acceleration after the Agricultural Investment Code was published and another in 1972, when half the total was distributed and a third of the beneficiaries were endowed. It is notable that the average size of holding increased more than 3 times between 1967 and 1972. This may

be due to a shift in the composition of land distributed away from irrigated land and toward dry land. Unfortunately, no information is available on the characteristics of the farms allotted each year. We do know, however, that nearly all of the land distributed after 1966 belonged to the "modern" agricultural sector. In other words, it formed part of the best land in the country whether wet or dry. The beneficiaries from 1969 onwards were very fortunate men indeed.

Over the entire period 1957-72 about 181,197 ha. of good annual crop land was distributed to 11,101 households. These households represented about 0.9 per cent of the families owning between zero and 1.9 ha., excluding nomads. Thus the impact of the programme on the problem of rural poverty was negligible. At the same time, roughly 12 per cent of the "modern" agricultural sector was turned over to this tiny minority.

The beneficiaries of the 1966 law were required to become members of an agricultural cooperative. Between 1966 and 1971, exactly 208 such cooperatives were formed. In 1972 this total was increased by a further 140, making a grand total of 348.⁷ The average size of these cooperatives is about 27 households and 479 ha., but the variation is considerable. For example, in 1972 the King distributed 6,265 ha. belonging to himself.⁸ One farm, of 4,865 ha., was organized into 3 cooperatives and divided among 185 families. Each cooperative was on average 1,622 ha. and each family received 26.3 ha. The second farm was 1,400 ha. and was kept intact as a single cooperative with 87 members, each household being allotted approximately 16.1 ha.

The Ministry of Agriculture appoints a Director for each cooperative. His job is to provide technical assistance, determine the rotation system (which each member is compelled to follow), keep the accounts, assist the cooperative in obtaining credit from the Local Agricultural Credit Bank (C.L.C.A.) and generally help the President of the cooperative council to manage the farm. At present the Director is paid by the Ministry, but it is hoped that after 5 years of experience with the new system the cooperative will agree to assume responsibility for paying his salary.

The method of cultivation combines features of a family farm with those of a collective. The land of the cooperative is organized on the pattern of a grid.

⁷In addition to the cooperatives there are numerous, i.e., about 500, rather informal "groups" of farmers who have joined together, e.g., to purchase agricultural machinery. There is some discussion of converting these into true cooperatives.

⁸Even after the King's gift the royal family is thought to own about 37,000 ha.

Each family is given a column of land. Cutting across the columns are a series of rows, each representing a different crop—wheat, cotton, artificial pasture, vegetables, almonds, etc. This arrangement allows certain tasks which enjoy economies of scale, e.g., ploughing and spraying to be performed collectively. Other operations such as weeding and harvesting are the responsibility of the individual owner. One row of each farm is “free” land, i.e., no particular crop has been designated for this land within the rotation pattern. This land is to be used by the farmer as he wishes: to raise chickens, to grow vegetables for sale in the local market, to experiment with new crops, etc.

Marketing of the main crops is done through the cooperative. The cooperative is required to sell its wheat to the state cereal monopoly (O.C.I.C.). Most other products, however, are sold freely to the highest bidder. Similarly, the cooperative arranges to buy fertilizer, mechanical implements, etc. for its members at the lowest possible price.

Further support to the reform movement was provided by the Agricultural Investment Code of 25 July 1969. In effect the Code constituted an explicit statement of the government’s agricultural growth strategy. The main features of this strategy were (i) the concentration of public investment and incentives on a few well defined areas, namely, the irrigation perimeters and (ii) the provision of special assistance to farmers who were considered to be small but viable. The strategy, thus, was egalitarian in that it was concerned primarily with the rich agricultural areas, but within these areas it attempted to be relatively egalitarian in that it encouraged the formation of cooperatives and “groups” and investment on farms of a minimum size of 5 ha.

In March of 1973 king Hassan II announced a programme of “Moroccanization”. This programme contained several elements designed to continue the process of de-colonization, e.g., greater participation by Moroccans in the ownership and management of industrial enterprises, but its central feature was the long anticipated transfer to the state of the remaining land owned by foreigners.

Precisely how much land is subject to expropriation is unknown. The approximate amount however, is thought by the government to exceed 260,000 ha. This includes, among others, land held by agricultural corporations in which the foreign interest is less than 100 per cent and may even be zero. According to the dahir all land held by corporations is subject to expropriation, but implementation of this provision already has caused some difficulty. If it is taken literally it implies that some companies owned entirely by Moroccans will be nationalized. In practice such companies will be excluded from the operation of the law, but

a problem still remains about what to do with companies in which the foreign interest is a minority one.

Most of the land subject to nationalization had been recovered by September 1973. An inventory of all the assets that were expropriated—land, buildings, animals and farm machinery—was initiated immediately, in April, but the listing turned out to be very incomplete and unsatisfactory. This partly accounts for the fact that the government still does not know how much land it has acquired.

All of the land expropriated under the dahir of March 1973 is “melk” and, hence, is eligible for compensation. The value of this land is unknown and in any case the terms of compensation are subject to negotiation, but it seems unlikely that the commercial value could be less than 3,000 DH ha. on average. Probably it is higher. If this minimum commercial value is paid, however, over 750 million dirham will have to be found. This is a substantial figure, but it is well within the capacity of the government to finance—if it wishes to do so. After all, it represents less than 3 per cent of the expenditure programme of the third five year plan.

The nationalized land is (or soon will be) managed by the state. The present owners are allowed to remain on the property until completion of the current crop year. In the case of citrus fruit, this means that the foreigners will not vacate the property until June 1974, at which time management of the plantations will become the responsibility of SODEA.

A separate state company, Société de gestion agricole (SOGETA), has been created to look after the majority of the expropriated holdings. In principle, SOGETA is an autonomous public corporation owned by the regional offices of the Ministry of Agriculture. At present, however, the corporation exists only on paper, and the expropriated farms are being managed by the Direction de Mise en Valeur (DMV) of the Ministry of Agriculture. DMV/SOGETA may farm the land directly or they may rent it out. Indeed, if they wish they may negotiate management contracts—even with Europeans, but in practice it is expected that most of the land will be cultivated directly as state farms.

An extension agent or agricultural technician should be appointed as manager for each farm, but unfortunately there are not as many suitably qualified managers as there are farms to be managed. As a result, some farms may be managed by inexperienced and incompetent technicians. The general solution that has been adopted, however, is for each technician to look after more than one farm; indeed, anywhere from 2 to 19 farms. Thus the outlook for the next few years

is not too encouraging. On the other hand, there is no need to despair. It would not be too difficult, with good management, to improve upon the performance of the European farms, since many of the ex-owners allowed their farms to run down gradually in anticipation of nationalization. A small amount of investment combined with a shift to higher value crops—plus a little luck with the weather—could result in a significant rise in output on the expropriated farms.⁹

Despite the speed with which nationalization has occurred, the ploughing seems to have been done on time, i.e., the land is now ready for sowing and is awaiting the first rains in October. The DMV diverted men and equipment from their normal assignments in order to accomplish this urgent task, and the results are reasonably satisfactory. If the rhythm of work can be maintained, there is no reason to fear a catastrophic fall in the production of staple crops, e.g., wheat. Supplies of more specialized crops, however, may be disrupted.

Partly to avoid disruption to production and partly to generate political enthusiasm for the programme of expropriation, some emphasis has been placed on active participation by local people. The King in particular, is anxious to involve the rural council or *jama'a* in productive activities on the nationalized farms.¹⁰ It is unclear, however, which tasks would be assigned to SOGETA and which to the *jama'a*. One possibility is that the *jama'a* would be asked to organize and arrange for voluntary, unpaid labour and tractor time to be put at the disposition of SOGETA for a few days during periods of intense activity and labour shortage. In return, 10, 15 or 20 per cent of the profits of the state farms would go to the *jama'a* to finance small projects of local interest.

This particular proposal probably ought not to be taken seriously. If it is necessary for resources to be mobilized quickly it is far more likely that the army would be used than a poorly organized institution such as the *jama'a*. The proposal is noteworthy primarily because it indicates the muddle of official thinking. SOGETA itself is supposed to be a transitory solution. If the old formula is followed of dividing the land in to individual holdings and grouping the beneficiaries into cooperatives, the corporation has an expected life of four or five years. That is, it should last as long as the current plan, but afterwards it should wither away.

⁹One nationalized farm that we visited consisted of 1,094 ha., 270 ha. of which was irrigated sugarbeet and the rest was wheat. Clearly, the possibility of introducing higher value crops on this land is considerable.

¹⁰See the speeches by King Hassan II on 9 July and 27 July 1973.

V. THE DANGERS OF A NEW COLONIALISM

The Marchdahir put an end to classical French colonialism in the agricultural areas. It did nothing, however, to prevent new forms of colonialism from arising, either from external or internal sources. Today there is a danger that the ambiguity of government policy and lack of decisive action will permit new forms of land concentration and rural dominations to emerge.

Already there is considerable discussion of the possibility of encouraging large scale foreign, especially American, investment in farming. The association between the King Ranch of Texas and the government of Morocco in establishing Ranch Adarouch illustrates what could occur.

The government has entered into partnership with King Ranch, the former putting up 49 per cent of the capital and the latter 51 per cent.¹¹ The contribution of the state consists entirely of 12,000 ha. of the best grazingland in the country, located in a lovely valley outside Meknes. King Ranch contributed about \$2 million of its own money. In addition it obtained a local currency loan of \$1 million from the U.S. Agency for International Development and a line of credit from a major American bank. In other words, for an own cash outlay of approximately \$200 per ha., King Ranch was able to establish a livestock operation on a scale and at a price that would make an old fashioned French colonialist blush¹²—and all this was obtained not against the wishes of the government but with its active collaboration.¹³ Thus even the risk of expropriation has been removed.

The King Ranch deal is a single episode. Far more important is the growing concentration of 'melk' land in the hands of large Moroccan landowners. Some of the newly acquired land has been purchased from small Moroccan farmers. For example several cases have been reported of large farmers with advance knowledge buying out small-holders in areas where large dams are to be constructed; in other cases the large farmers merely rent the land from small holders.¹⁴ More

¹¹The purpose of the project is to cross Santa Gertrudis cattle from Texas with local stock and develop richer grasses for intensive grazing.

¹²The average size of a French owned farm at the time of independence was 200 ha. or less.

¹³Indeed the government was responsible for evicting the 800 families who formerly used the land.

¹⁴This is profitable in part because large farmers have greater ease of access to scarce resources than to small farmers, e.g., credit. Yet ironically, the repayment rate to the C.N.C.A. of credit received by large farmers, i.e., those with a "fiscal income" of more than 2,000 DH a year, is only 77 per cent, whereas the repayment rate of small farmers is 82 per cent.

significant, however, has been the transfer of foreign owned farms to the Moroccan landed elite on a massive scale. Some of this land was sold by departing French settlers between 1956 and 1963, i.e., before government permission to sell land was required. Some was sold legally, i.e., with formal permission, after 1963 and some was transferred illegally.

The total amount of land transferred from the French to private Moroccan farmers is likely to be between 428,505 and 503,731 ha. Much of this occurred after 1963 and violated the spirit if not the letter of the law. One can only guess at the number of strictly illegal transactions, but it is possible that 100,000 ha. were involved.¹⁵

In particular localities the amount of land transferred illegally can reach impressive proportions. Consider, for instance, an area of 12,000 ha. that falls within the Sebou irrigation project. Originally 3,818 ha. belonged entirely to foreigners. As of December 1969, however, 7 per cent had been sold officially while 45 per cent had been sold unofficially or otherwise transferred to Moroccans; 44 per cent was theoretically unsold and 4 per cent was unaccounted. In addition, there was a small amount of land jointly owned between Moroccans and foreigners. Clearly, the extent of illegal sales in this region was a multiple of the legal sales.

Whether or not the transfer of land from foreign to Moroccan individuals and companies was legal is of relatively little importance. The crucial point is that these transfers from the colonialists to the Moroccan elite were far larger than the land redistribution which occurred under the official agrarian reform programme. For every hectare that was distributed under the official programme, about 2.5 ha. was transferred outside the programme. The real land reform in Morocco proceeded quietly behind the scenes and enriched an indigenous elite. Meanwhile, the official programme, incapable of solving the problems of an impoverished majority, set about creating a middle class to act as a buffer between the landlords and the landless.

VI. PROPOSED LAND REDISTRIBUTION, 1973-77

Remarkably little is said in the plan about the future of the land redistribution programme. We are told that the target is to distribute nearly 400,000 ha., but we are not told how many beneficiaries are anticipated. We are told that land

¹⁵The true figure could, of course, be much higher. The estimate in the text is that of the Director of DMV.

ceilings may be adopted in principle, but we are not told when or what the ceiling might be. Finally, we are told that 123 million DH has been allocated in the plan to land reform. That is all.

The first thing one needs to know is what land the authorities believe can be redistributed. Table VI contains the beginning of an answer.

TABLE VIII
PROPOSED LAND REFORM, 1973-77

	(hectares)
1. Individual Foreign Holdings	172,367
a. Irrigated Land	(39,278)
b. Dry Land	(133,089)
2. Land Owned by Corporations	93,548
a. Irrigated Land	(28,218)
b. Dry Land	(65,330)
3. Habous Public	24,151
4. Glaoui Land	12,569
5. Confiscated Land	14,622
6. Other, as yet Unknown	77,733
Total	395,000

Apparently the authorities believe they can account for the origin of 317,275 ha. to be distributed. The remaining 77,733 ha. needed to complete the target of 395,000 ha. however, remains to be discovered.

Over half the land thought to be available for redistribution consists of farms recovered from individual foreign proprietors. Another 93,548 ha. consists of land held by corporations and subject to expropriation under the March 1973 dahir. Only about 70,000 ha. of this land, however, is believed to be owned by foreign controlled corporations; the rest is held by Moroccan farms. It remains to be seen whether companies in which the majority of shareholders are Moroccan citizens will be expropriated. If they are not, the target will be difficult to achieve. Moreover, as we indicated in the previous section, much of the land thought to be available for redistribution already is being farmed by Moroccans or is in the process of being sold, or both. Thus in practice much of this land will not be available.

A small amount of *habous* public land is available for distribution. This is land belonging to religious institutions and at present administered by the Ministry for Islamic Affairs. In the past, *habous* land has been rented out in small plots at public auction. In the future, presumably, leaseholders will be converted into freeholders.

Glaoui land is land belonging to the Pasha of Marrakech, a collaborator of the French colonial regime. Most of this land probably will be sold to sitting tenants.

Lastly, some land has been confiscated from opponents of the existing regime and from those who have committed serious crimes against the state. This land will be redistributed along with the ex-foreign owned land.

How much of the land to be distributed is irrigated and how much is '*bour*' is unknown. It is thought that about 67,000 ha. of the land recovered from Europeans is irrigated, but it is hoped that there will be sufficient irrigated land in the remaining four categories of Table VIII to bring the total up to 135,000 ha. This implies that the minimum amount of '*bour*' in the target programme is 260,000 ha.

The responsibility for administering the reforms in the irrigated areas rests with the Regional Offices of the DMV. In the '*bour*' the responsibility rests with the *Services Provinciaux*. A paper prepared in the Planning Secretariat contains the following schedule for redistribution in the five years of the plan by these two agencies :

TABLE IX
SCHEDULE OF LAND REDISTRIBUTION, 1973-77

Year	(hectares)	
	Offices Regionaux	Services Provinciaux
1973	10,000	
1974	30,000	30,000
1975	30,000	50,000
1976	30,000	90,000
1977	35,000	90,000
Total	135,000	260,000

Table IX indicates that in the first two years of the plan less than 18 per cent of the total programme will be implemented, whereas in the last two years it is expected that 62 per cent of the programme will be implemented. Redistribution in the '*bour*' is planned to begin slowly and then accelerate swiftly, while

redistribution in the irrigated areas is expected to proceed at a more even pace. Why this is so is unclear. Indeed the schedule of implementation could well be the reverse in the two agencies, since most of the 'bour' to be distributed at least has been identified in principle, whereas half the irrigated land remains to be found.

Let us assume that the land to be redistributed is found and that the programme is completed as scheduled. How many families are likely to benefit from land reform in Morocco? The answer depends, of course, on how much land is given to each family. If one assumes that the holdings distributed in 1973-77 will be as large as the average of the holdings distributed between 1957 and 1972, viz., 16.3 ha. then 24,233 families can be given land. The authorities, however, appear to envisage distributing smaller holdings in the future than in the past. Five hectares per family in the irrigated zones and 15 ha. in the 'bour' are commonly mentioned. If this pattern is in fact implemented the number of beneficiaries would be nearly twice as large as our first estimate, namely, 44,333 families, of which 27,000 would be given irrigated land and the rest 'bour'.

These Figures need to be kept in perspective. Even if we assume (i) that 395,000 ha. will be available for distribution, (ii) that 135,000 ha. of this is irrigated, (iii) that each family receives 5 ha. of irrigated land or 15 ha. of dry and (iv) that the programme is implemented as planned, only 3.6 per cent of the rural households (excluding nomads) with either no land or less than 2 ha. will benefit. Of course some households were beneficiaries of earlier programmes, but as we have seen, they represented less than one per cent of the rural poor. In other words, at the end of two decades of land redistribution, after the completion of the programme contained in the plan, only 4.5 per cent of the landless and near landless will have been touched by what the King chooses to call "Moroccan Socialism".

What will happen to the other 95 or 96 per cent of the rural poor is the great unanswered question. If our analysis is correct, their income probably will continue to decline slowly. This is even more likely when the planned agrarian reform is put in its correct demographic context. The rural population is increasing 2 per cent a year, implying that the number of additional rural households created in each year of the plan is, on average, about 35,500. This should be compared with our estimate of the maximum number of beneficiaries from land redistribution, over the entire planning period, of about 44,000—or between eight and nine thousand a year. The implication is evident: for every new household which receives land under the programme, 3 households will join the ranks of the landless. That is, the annual increase in rural households is 4 times larger

than the average number of land reform beneficiaries each year, under the most optimistic assumptions.

VII. REFLECTIONS ON A POSSIBLE FUTURE

In our opinion the existing model for land redistribution, the agrarian reform cooperative, cannot form the basis for a massive attack on rural poverty. Let us summarize the reasons why. First, the individual holdings distributed are too large to be consistent with providing the majority of landless and near landless peasants with farms of average size. Second, the cooperatives are too heavily subsidized in terms of machinery, fertilizer, seeds and credit. If subsidies of the present dimension were effectively extended to the entire rural population, the claims on state budgetary resources would be unbearable. Third, the cooperatives are too closely controlled by the government and too dependent for success on the personal qualities of the appointed Director. Already there are too few directors for the existing cooperatives. In the Tadla irrigation perimeter, for instance, there are 5 directors for 19 cooperatives; in the Gharb Plain there is one director for every 2-4 cooperatives. The problem is likely to become much worse if attempts are made to expand the number of cooperatives quickly. One possibility would be to increase the average size of a cooperative.¹⁶ Another, and in my view more preferable solution, would be for the government to cease providing free directors after, say, 2 years. Thereafter, the cooperatives would have to pay for technical advice (if they wanted it) and book-keeping services (which the C.L.C.A. would surely, and rightly, insist upon). Better still, the form of the cooperatives should be radically altered in such a way that a government appointed director would no longer be necessary. In addition, private suppliers of fertilizer, insecticides, credit, etc., should be encouraged by the government to compete with state suppliers, rather than inhibited as at present. This would further reduce the demands on the limited administrative resources of the state.

The government has very rigid ideas about what constitutes a minimum size for a viable farm: 50 ha. for citrus plantations, 10-25 ha. of dry land and 5 ha. of irrigated land. In my opinion this approach is backward: one should be searching not for a minimum size of holding but for a maximum. The imposition of excessively high minimum standards is one of the reasons why existing programmes have made such a small impact on reducing poverty. Earlier we examined the merits of instituting a ceiling of 9 or 10 ha.

¹⁶There is some discussion in the government of increasing the average size of a cooperative to 100 households through amalgamation with existing cooperative and in corporation of private landowners.

If the future of the poor is to be more promising than the past, if the gradual impoverishment of the peasantry is to cease, there is no available alternative to radical transformation of property relationships in agriculture. We have previously argued that on grounds of efficiency and employment small holdings are superior to large. Thus there need be no conflict between output and equity. There may be conflict, however, between equity and growth.

This could arise if smallholders are heavily subsidized, as is the case with cooperatives now, and hence resources that otherwise would be available for investment are diverted to maintain somewhat higher standards of consumption in rural areas. The more the government is determined to assist the mass of the agrarian population by providing easier access to land, the more important it is that subsidies in all forms be reduced and if possible, eliminated.

But even if this is done it is conceivable that the beneficiaries of a land redistribution will prefer to consume most of their additional income rather than invest it. This point should not be exaggerated, but even when allowance is made for the considerable savings capacity of small peasants, the amount of voluntary accumulation may be insufficient to finance a sustained high rate of growth. In that case government policy must ensure that the contribution of agriculture to the overall savings effort is adequate.

There are numerous ways of doing this, but three instruments in particular merit greater consideration here. First, if land is to be sold to the beneficiaries of agrarian reform, the price of the land should be high enough to compel the recipients to make a serious effort to save. At present it appears that land is being sold at a heavily subsidized price, perhaps as much as 50 per cent. This policy is inconsistent with an objective of achieving a high rate of investment and growth.

Second, savings can be extracted from the rural sector by imposing a tax on land. The French colonial administration was able to collect such a tax, but since independence it has been allowed to atrophy. If the present government wishes to maintain a system of private ownership in agriculture the many advantages of a land tax should be examined. Once the administrative machinery is established a tax on land is less easy to evade than an agricultural income tax. Moreover, the tax can be made universal and broad, with the result that a low rate of tax can yield a high level of revenue. A land tax has a further advantage in that being a fixed tax it provides a strong incentive to increase total output without distorting the composition of output.

Of course the government may not wish to perpetuate a private freehold system in rural areas. There is a long tradition in Morocco of collective and tribal ownership of land, of state land and of land owned or administered by religious institutions (*habous*). This tradition has been continued since independence by the creation of several state enterprises responsible for managing agricultural holdings: SOGEA, SODEA, SOGETA, etc.

There is little doubt that in principle, state, collective or communal ownership of land can be beneficent. Depending on the precise system adopted, it enables the state to ensure that all have equal access to land. It can be egalitarian at any moment in time while preventing the concentration of landed wealth in the course of time. State ownership can be used to accelerate the speed with which technical changes are introduced and its control over the resulting output can be used to ensure that the marketable surplus is sufficiently large to satisfy the needs of urban areas.

The disadvantage of collective ownership is that it often entails either state management or no management at all, both of which tend to be inefficient. Morocco, unfortunately, has ample experience of both faults. It is widely recognized that management of the state farms established in the 1960's has been deficient, and numerous administrative reorganizations have occurred in an attempt to remedy this. It is equally widely recognized that the lack of management of collective grazing land has contributed to the distressing poverty of the livestock sector.

These problems could be overcome, however, if public ownership of land were combined with private management. A good way of doing this would be to follow the procedure formerly used to administer the public *habous* land: lease holdings to private individuals at auction. Under such an arrangement the state, or the local community, would receive rent, as landlord, and an auction system would be adopted to ensure that the leasehold rents approached a commercial level. The effect would be broadly similar to a land tax. Indeed this third device could be combined with the other two mentioned above, rents being used to extract a surplus from lands owned by the state and land taxes plus sales price being used to extract a surplus from land owned by private individuals.

The policies discussed in this section so far are designed to convert agriculture, and especially the reformed part of agriculture, from a sector which absorbs investible resources into one which releases them. The larger is the reformed sector, the more important it is that it contributes actively to the growth process.

As we have seen, at the end of 1972 the reformed sector consisted of 181,194 ha. This was of little significance in the context of the entire agricultural sector, but it did provide valuable experience for more far reaching programmes in the future. The task now is to accelerate the process of agrarian transformation and ensure that its benefits are spread as widely as possible. The obvious next step is to implement the target of the 1973-77 five year plan. Again, as we have seen, a redistribution of 395,000 ha. is unlikely by itself to prevent the further impoverishment of a large part of the rural community, but if the programme focusses exclusively on the 21 per cent of the rural population who are utterly landless, it could have an impact on this group. Under our optimistic assumption about the number of potential beneficiaries from the planned reform programme, 12 per cent of the landless could receive land over the next half decade.

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Microregion, Market Area and Muslim Community in Rural Bangladesh*

by

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I. INTRODUCTION

In this paper I attempt some tentative generalizations about the nature of community in rural Bangladesh. Admittedly, the data base for such an effort is not large. Nonetheless, the published writings of some of those few social scientists who have done research in rural East Bengal have provided us, I believe, with a modicum of the "social facts" of the Bangladesh countryside sufficient to the task I undertake here. I think, moreover, that such an effort at this time is not as premature as it may seem. In the first place, the emergence of Bangladesh as a new nation state of South Asia and the circumstances accompanying its creation have served to stimulate increased interest in Bangladesh research. If one believes, as I do, that Bangladesh society and culture represent a significant variant of that agglomeration known as "Indian civilization", it seems appropriate that what is thus far known of that variant ought to be summarized as a guide to interested scholars, furnishing potential hypotheses for their research. In the second place, it is clear that the economic development of Bangladesh will engender the need for accurate understandings of the character of the rural communities whose members must be enlisted in the development effort. Older, ill-informed notions regarding the countryside will not do for these purposes nor will, as has been the case in some past instances, the application of data from what is known of other South Asian peasantries to Bangladesh. In a word, the emergence of Bangladesh has left us with a watershed in South Asian studies generally and Bengal studies in particular, at which point we can now assess what we "know" about rural

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East Bengal as a guide to what, for various purposes, we still need to learn. This paper seeks to provide part of that assessment.

II. MICROREGIONS

In a very recent paper, Morton Klass (1972 : 605 *et passim*) has once again called our attention to the need for Indianists to move beyond the study of the single village in search of the "total community—the basic unit of organization and cultural transmission", of which "village" and "caste" are only part of a large complex of groupings and their extensions. Klass' exhortation in this regard is, of course, the sounding of a familiar refrain. By now the old British notion of the "village republic" is long dead and a host of studies, with concomitant debate, on the relationship of the "village" to "Indian civilization" and the structure of South Asian society as a whole have been put forward to attack and annihilate this older conception. Much of this rather extensive literature has relevance at some level and in some context or other to the problem of delimiting the appropriate units of the rural community, but I do not intend to resuscitate here the data and argument the question has generated.¹ I wish rather to follow up and build upon the descriptions provided by Klass and others which aim at identifying the social groupings constituting rural Bangalee community.

The thickly populated Bangalee countryside exhibits a plethora of peasant homesteads whose spatial randomness appears dictated, under preindustrial technological conditions, by the search for whatever bits of relative altitude can be found or built up in the low lying deltaic terrain which is so subject to monsoon-inflicted flooding. These ecological conditions tend to militate against the development of peasant villages as territorially bounded "residential social systems" [15, p.7] which would serve the naive researcher as "obvious" or "logical" spots to begin inquiry. Indeed, East Bengal's hinterland visually displays to the outsider the kind of "vagueness" which Geertz [10, pp. 102-103] attributes to the Javanese villages whose ecological conditions would seem to possess parallels to those of East Bengal.

In this context, the groupings Bangalee peasants call *gram* or "villages" are ephemeral and elusive entities. In the words Geertz has used to discuss rural Bali, they exist as only single elements in A "compound of social structures, each based on a different principle of affiliation" [9, p. 991]. One is, indeed, impressed

¹The reader who wishes an introduction to the issues in this debate may usefully consult the paper by Sharma [14] which reviews them and provides a fairly complete bibliography of the relevant literature.

with the paucity of centripetal forces flowing inward to sustain the "unity" of the Bangalee "village" and the contrasting multiplicity of centrifugal forces thrusting it outward to mesh with other socio-political groupings. It has few collective activities which serve to thicken the bonds of fellow feeling which the notion of "village" might normally conjure up. Often no single headman is found at the helm of "village" affairs. What exists in the way of indigenous "local government" is not officially merged with any past colonial or national administrative structure, although I and others have tried to show elsewhere [3; 4; 6; 19], local economic and political power brokers have had a way of always showing up in the official organs serving the extension of state power to the rural areas of East Bengal. Kinship alliances impel the "villager" ever outward from home ground, and the rural economy enmeshes the peasant in a complex web of "extra-village" institutions and relationships. Few religious groupings or ceremonies bring the "village" *per se* together in moral or sentimental solidarity. The researcher who seeks the "village" as expression incarnate of the Bangalee rural community has indeed focused on a "part culture" and "part society".

Although it is an important native category, then, the "village" is only one of a number of groupings which comprise the rural community, its very existence as a structural unit dependent on other social forces. These various groupings extend in time and space over what I shall call here a *microregion*. The term is not my own, wherever and however else it may have been used, it refers to a concept employed in discussion by Bengal scholars over the past several years, first finding written expression, to the best of my knowledge, in an unpublished paper by Ralph W. Nicholas, describing the West Bengali multi-village unit in which he did field work in 1968/69. Rather than linking the concept inextricably to that of "village", however, I should like to advance the following preliminary definition of such an entity. In the East Bengal context at least, a microregion is, "a territory encompassing a complex of social groupings with varying memberships, whose population at some central level of organization finds moral, ritual or political expression as a single community distinct from others". The microregion may involve a number of "villages", as Nicholas (unpublished paper) has found in West Bengal and I (3; 4) and Smith [18] have encountered in East Bengal. But, judging from the work of Ellickson [8], it may also be limited to a single recognized "village". Yet another report [11] describes the existence of politico-religious groupings in Bangladesh which take form independent of, and even engulfing, the "village". I shall refer to these studies in more detail below. The important point here is that microregion involves various kinds of social groupings, of which the "village" is usually only one. It is a relative concept, one which I deem suitably general enough to include whatever

may pass for the expression of community in any particular Bangalee context. In what follows I attempt to delineate the kinds of groupings a microregion may include.

III. SOCIAL GROUPINGS IN RURAL BANGLADESH

Bari

One must inevitably begin a discussion of social groupings in Bengal with reference to the peasant homestead (*bari*), the residential locus of a patrilineal kin group (*gusthi*) and commonly, any matrilineal and/or affinal relatives who for various reasons may have come to live with the patrilineage. The residents of most homesteads composed of more than a single nuclear family nearly always divide themselves within the compound along lines of property ownership (especially cultivation land), be these owing units either nuclear or joint in family structure. The resulting subunits of both kin group and homestead are inadequately, but most easily, described in English as "households".

The Bangalee words designating various elements of the "kinship geography" of the peasant homestead reflect far more meaningfully the structural arrangements and moral bases of this "building block of rural community" in Bangladesh. The word *bari* itself generally evokes the notion of a building, usually a dwelling, the residence of a particular lineage or family. When modified by an adjective, the noun, *bari*, may take on concrete local imagery in identifying its residents as being of a particular social type, status or occupation. Personal adjectives may attach to the *bari* as well, associate the residents in the minds of their neighbors with certain salient behaviors of the most prominent members, either currently or in the remembered past.² One thinks, in short, not merely of "a house and home", but also of what manner of men and women live there and the ways in which they relate to the larger community and the world in general.

Within the homestead, other words call forth reference to its constituent units. The word *ghor*, meaning "house" or "room", implies more abstractly the concept of "shelter", and in the context of the homestead's kinship geography it is a semantically marked referent for the place which houses an economically independent subunit of the larger kin group, a "household" as I have used the term. Socially, its inhabitants comprise not only a man's family of procreation, but the latter

²For example, *Bhuiya Bari* indicates the "home of the Bhuiya family", whose traditionally prestigious title denotes high status, at some point probably based on solid wealth.

has a further obligation to shelter other members of the larger kin group of either spouse as the need or request arises; the Bangalee word *poribar*, the word most commonly translated as "family", designates this social unit. But the household is also called a *chula*, "hearth", "oven" or by implication "a cooking group", as well as sometimes a *khana*, "meal", "food", suggesting an "eating group". These words underline an important element of symbolism by stressing the fact that the household members share food together. Thus, the ideas and sentiments these various words evoke give clues to Bangalee ways of thinking about family and community.

Para

While the homestead and its subunits constitute the minimal grouping of rural Bangalee society, on this rock of kinship the next level of organization is built when several homesteads cluster together in sufficient mutual proximity to form what every where in Bengal is called a *para*—"neighborhood" or "quarter". A *para*'s formation is conditioned by the topographical and climatic factors which, as I have noted above, perforce influence homesite selection. Socially, it is very often composed either of agnatically related homestead kin groups or, where common linear descent does not link all the neighboring families, they are usually united by castes (in Hindu-dominated areas of Bengal), socio-religious solidarity (where Muslims, Hindus or other religious groups constitute a local minority).³

The term *para* is used to designate a given area of any "village", be it part of a historically designated revenue unit (*mouza*) or a socially recognized *gram*, which is at all inhabited. When socially composed of two or more homesteads, these may be, but are not always, agnatically related or else united by instance of homestead intermarriage, although, again, no specific marriage rule dictates that this must occur. If the inhabitants of a *para* merit some locally applied social or occupational designation, it is often so described, as in, for example, *thakur para*, "the Brahmin quarter", otherwise, a *para* is usually and simply denoted adjectivally by its geographical location within the relevant territory, as in *uttar para*, "north end", *dakshin para*, "south end", or *madhya para*, for those who live "in the middle of it all". While it forms the basis for social groupings beyond the level of the homestead, and may contribute to the formation of local factions, the *para* is never given formal, specific expression as a social unit *per se*. Rather, as a cluster of geographically proximate homesteads, it provides the social raw material from which formal organization is constructed.

³I have discussed the process of village settlement in one area of Comilla thana [3, pp. 45-55] Ellickson [8, pp. 54-58] provides additional data on *para* organization.

Reyai

In the various parts of Bangladesh for which we have reports in any detail, there exists an important socio-religious political grouping known variously as *reyai* or *mallot*. The word *reyai* is used in Comilla thana for this grouping, from which area we have the most detailed studies [3; 8; 22]. Membership in Comilla *reyai* corresponds roughly to *para* location, but as the above studies make clear, membership is not fixed over time, fluctuates with the fortunes of local factionalism and is thus by no means always consistent with the neighborhood location of membership of member lineages and homesteads. The available data from the Comilla studies suggest that, in this part of Bangladesh at least, *reyai* memberships are likely to encompass on average between 7 and 8 homesteads with populations of between 100 and 200.

The *reyai*'s significance as a key social group lies in its political and ritual functions. Politically, it is always at least nominally headed by one or more *sardars* or *matabbars*, whose principal role is to arbitrate disputes among the members. These formal "leaders" usually come from the economically and/or demographically dominant lineages and homesteads in each group, although as Ellickson [8, pp. 58-66] points out, such lineages are not the sole producers of influential men whose words carry weight in local affairs. Ideally, the role and status of *sardar* and *matabbar* is passed from father to sons in order of birth. But, in part because the system of conflict resolution allows for and often requires consultation with *sardars*, *matabbars* and other "influentials" in several *reyais*, and in part because such men most often represent the most powerful families in immediate area, a new claimant to this traditional leadership position must seek legitimation of his claim from the already existing *sardars*, etc., in nearby *reyais*, usually acknowledged in a formal feast [3, pp. 150-65; 8, pp. 54-58; 22, p. 63]. Indeed, in many cases, it is precisely this ritual recognition which, when withheld as a political weapon, is efficient cause or symptom of local factional disputes.

The very word, *reyai*, seems to indicate something of the ideal structure, as well as the moral basis, of the group as summarily described above. Etymologically, it appears to come from Arabic, perhaps from the words *ra' lyyah*, meaning "follower" or "citizen" or else *Ra'l* "shepherd", "one who tends a flock", both words perhaps derived from a single root. In Bengali, however, various words which seem to reflect this Arabic origin convey the notion of "favor", "pardon", "indulgence" (*reyat*), and, significantly, "favorite", "protege" (*reyati*). Thus, grouped traditionally around the locally dominant lineage(s), the members of the *reyai* are "followers", "favorites" and "proteges" of the former,

which usually provide(s) the focus of leadership in local affairs. The "citizens" of this small grouping are also ritually united by the fact that they share food on ceremonial and religious occasions, such as weddings, to which, ideally with the *sardar(s)* as final arbiter(s) as to the "guest list", only *reyai* members, other than kinsmen, can be invited. In some instances, the feasts of the two *id* celebrations are shared among *reyai* members, marked especially by the giving of meat to the less fortunate families of the group [8, p. 93], and elsewhere prayers on special religious occasions, such as *Shab-i-Barat*, or the *tarabi namaz* performed each evening of *Ramadan*, may be done in congregation with one's fellows in the *reyai* [3, p. 128]. In my observation, too, the relative closeness of interaction in a *reyai* grouping seems reflected in the mutual address of members by kinship terms, even where no such ties exist, and in the relaxation of *purdah* restrictions in inter-homestead visitations of women. Thus, in the environs of Comilla town at least, rural Bangalees have traditionally tended to gather themselves, above the level of the homestead—based kin group, around the most prestigious and dominant families to whom they are physically closest and whose members, providing political and ritual leadership, give both central focus and impetus to significant events.

Village

What, then, of the proverbially golden Bangalee village, whose name has evoked much poetic imagery in the literature of the region and continues to spark its elites' imaginations? Although the fortunes of this ephemeral microcosm continue to dwindle as the forces of the delta's traditional ecology work their logic against its existence, it persists as an important native category of organization. But centuries of diverse administrative practice have stretched, strained, pushed and pulled the "native" concept of "village". For probably the last three centuries, at least, the mignira of successive state hierarchies have concerned themselves with revenue units known as *mouza*, if then, today peasant Ali Miya identifies himself as coming from "Village Sherhpur" or as a resident of "Village Kadamnagar", he is in all likelihood naming the *mouza* in which his homestead lies. In the terse words of the British administrator who carried out the last complete revenue survey of parts of Comilla *thana*, "many so-called villages are merely bits of land dignified with that name because they are so noted on Collectorate lists" [7, p. 8], and anyone who in the past decade has poured through the "village" listings available at local land tax offices in Bangladesh may attest to the continuing veracity of those words. Pakistani census officials compounded the problem of village definition by agglomerating *mouzas* with socially reorganized *gram* to produce what is known as a census village and, whatever demographic fruit

that category may have yielded, in my experience it served only to delude the naive investigator in search of the "Bangalee village" [3, p. 12-14].

Thus, a rural dweller is identified to the outsider by the name of the *mouza* in which he or she resides. When Bangalee peasants use the polysemantic term *gram* ("village"), they are contextually referring to that complex of social groupings in whose midst the enormity of their day to day activities are carried out or with whose members they unite in common political and ceremonial endeavor on different occasions. The term "village" on the ground is potentially one of my multivariate constellations of the kinds of groupings I have identified above. "Villages", then, are sociological and folk mediles sounding forth amid a host of others from the demographic cacaphony of the countryside. What common factors do they possess from which we might derive some social structural consistency in the formation of such groupings? I can suggest at least three telltale indicators of local social solidarity at this level. The first of these is relative proximity of homestead location. In many cases, despite the seemingly random settlement pattern evinced by the surrounding countryside, the homesteads comprising villages are well marked off in mutual proximity from other like clusters, by paddy fields or spots or waste or wooded land. Typically, this localized geographical patterning tends to facilitate the kinds of human interaction among families which perforce contribute something to a sense of parochial solidarity. The second, and related factor, the location of cultivation land. Usually, the largest collective share of relevant group members' cultivation land is to be found, despite great fragmentation, in or adjacent to the *mouza* (s) in which their homesteads are located (which fact further reflects the relevance of the revenue unit as an important "village" category). I have been able to document this fact for Hajipur and Tinpara [3, pp. 104-106] in the *Comillathana* and, although Ellickson [8] has not reported data which would support this generalization, the fact that Shaheenpur (Ellickson's village) is self-contained in a large *mouza* would lead one to suspect that it applies in this case as well. A third factor is a modicum of informal political unity symbolized on at least one significant ritual occasion in the yearly ceremonial cycle. Hajipur "villagers" met together at least once a year for a ritual occasion, the evening of *Shab-i-Barat*, the "night of reckoning" on which all Muslims acknowledge Allah's judgement of their lives and pray that He will be merciful. This gathering, which was held at the large homestead of the most wealthy lineage of the *mouza*, occasioned the visit of the prestigious *moulana* who served the nearby mosque and the collection of dues (*chanda*) for his payment and the mosque's upkeep. Though at the time of my visit Hajipur was rent by factionalism among the three dominate *sardari* lineages and their respective *reyais* the "villagers'" essential sense of social and political unity was reflected in that a cooperative

society of two years' standing had encompassed members of all its homesteads in its embrace.⁴ Tinpara's unity was similarly symbolized by ritual occasion, nearly always at the home of the wealthiest man; a local cooperative also was organized in this "village". From Ellikson's account, Shaheenpur people seem to unite only on the occasion of *id*, hence twice a year, at the *idgha*⁵ located in the central *para* of the "village".

Thus, in the Bengal context, one cannot posit rigorous criteria of corporateness by which to "prove" the existence of the "village". For villagers, it seems, it is enough that they have a few close neighbors whose homes as well as their own lie adjacent to most of their fields and whose political and social relations are at least on some occasions formally expressed by participation in ritual and the sharing of food. And what is enough for them must be enough for us, social scientist strangers in their midst.

Multi-mouza Groupings

Two of the available studies from Bangladesh stress the existence of *multi-mouza* units which take political form and evince a certain amount of common group identification as expressed in ritual or ceremonial ties. Such was the case in my own research, in which I found that the various *reyai* groupings which comprised Hajipur and Tinpara were linked to a political unit composed of 11 *reyais*, respectively headed by one or more each of 14 *sardars*, from 8 continuous *mouzas* covering a territory over just over a square mile with a total population of perhaps 1,800. The *sardars* of this *multi-reyai* grouping acted as a kind of corporate "Council to Elders", to whose collective judgement (*bichar*) a dispute in any part of the relevant territory of their "Jurisdiction" could be submitted if the parties involved so wished [3, pp. 19-21 *et passim*]. The ritual unity of this political grouping, to which the term *samaj* (society) was applied, was evident in the fact that the *sardars* of this group attempted to exercise control of who might become

⁴According to the Census of East Pakistan of 1961, there were less than 23,000 *imams*, *mullas* and other "religious workers" in the agricultural labor force of around 14.3 million. These scarce religious specialists serve a rural population of 48 million living in some 64,000 officially designated "villages". It would be interesting to learn if their number has declined over the past century. For if these clerics ever did, as seems likely, perform central roles in the maintenance of rural social solidarities, their scarcity now is indicative of the cumulative impact of total underdevelopment on the traditional social order.

⁵The term denotes open fields, sometimes walled off, reserved exclusively for congregational worship on the Muslim holidays of *Id-ul-Fitr* and *Id-ul-Azha*.

one of their number through the legitimizing mechanism the feast I have alluded to above. *Mouza* contiguity, relative concentration of the constituent population's cultivation land location and a palpably evident tendency for marital exchanges among area homestead, particularly those of the *sardars* themselves, help to account for the emergence of this kind of loose political organizations, to which population density and scatterdness of settlement pattern must also be reckoned to contribute. It should be noted that the various *sardars* "represented" *reyai* groupings, not *mouzas*, this tending to underline the fact one cannot think of the "village" as a concrete political entity here unless the term *gram* happens, in any given local instance, to be applied to a *reyai* grouping itself.

And apparently the Comilla *thana* area is not unique in displaying this kind of penchant for group extension. Marion W. Smith, in what, though now obscure, was probably one of the first anthropological accounts of a South Asian peasant community, describes for Sylhet District "the existence of a Seven-village unit which functions as an economic and social entity" [18, p.592]. The 7 "villages" were contiguous and surrounded by fragmented cultivation lands the bulk of which belongs to the local inhabitants. Politically, each of the 7 was reported to have its own *panchayat* or local council, and, while Smith's account does not indicate that these were formally interlinked, she makes clear that when collectively threatened by some outside threat, particularly in the form of land encroachment, the seven "villages" could unite with good effectiveness. The obligation to extend marriage feast invitations to kinsmen in the same "village" first, then to other non-kin co-residents, and, depending on ability to assume the costs, progressively to the other "villages", suggests ceremonial expression of solidarity which has been described above for other areas of Bangladesh. Smith's article, unavoidably limited in data because it resulted from a "culture-at-a-distance" research effort in which a Bangalce Muslim student informant was interviewed in a class in research methods, nonetheless provides, in the context of other data from East Bengal, useful support for this essay's implicit hypothesis that territorially extensive kinds of overlapping group formation are typical of rural social organization in Bangladesh.

Microregion (revisited)

A microregion, then, consists of a territorial complex of the kinds of groupings I have sketched above all of which give at least occasional expression at some central level of organization to the kinds of political oneness and morally unifying activities and sentiments we associate with the word *community*. As in the case of "my" Hajipur and Tinpara and the samaj unit of which they are part, and of the "seven village unit" described by Smith, the microregion

can consist of number of contiguous *mouzas* and the plethora of groups found within them. Or, as Ellickson's study shows, under the appropriate geographical and demographic conditions, a microregion can comprise what local people call a single "village". While Glasse's description of his research area does not make available the kinds of data which would allow us hypothetically to delimit the typical character of microregions there, everything he relates is sufficiently similar to what we can say of Comilla *thana* and Sylhet *thana* it seems not unreasonable to think the concept could be found applicable elsewhere as well.

Can we wrest from this plethora of diverse data any generalizations of value to guide us to an understanding of the process by which organization takes place? I suggest that at least two principles of social structure whereby the formation of a microregion occurs.

The first of these I call the Principle of Clustering Around Strong Points. I owe this formation to Eric Hobsbawm's [12] discussion of the Sicilian Mafia. I am struck, however, by the relevance to Bengal of Hobsbawm's statement that in communities where state power has extended in a discontinuously effective and minimally operative manner to bring "law and order"—as was the case in Bengal until the 1870's at least—"power is rarely scattered among an anarchy of competing units, but clusters around local strong points" [12, p. 33]. As in Sicily, much of rural Bengal has been "lawless" in this limited sense for centuries. Under conditions in which "local government" and community organization were left to form themselves so long as they did not conflict with the demands and needs of more powerful levels in the hierarchies of Hindu, Mughal and British state systems. Under the conditions of gradually increasing settlement, it seems likely that people in the small homestead and lineage groupings which were to become typical of the Bengal Delta tended to accord a modicum of formal leadership to the locally most powerful of their number. Power and influence, then, coalesced around local "strong points", and, exercised by patron-client kinds of relationships, appear to have been the basis for the development of "community" expressed in the *reyai* groupings I have discussed, each with its *sardars* and religious leaders, united as a "village". We know from Calkins' [6] account of 18th Century Bengal that local individuals performed the intercalary roles of relating "village" to state, often willingly seizing the outstretched hands of revenue and other kinds of administrators who offered concrete material gain for cooperation, which advantage could in turn be translated into local prestige and power.

The second key element in the process of microregional development may be stated as the Principle of Class-based Extensiveness. I have argued elsewhere [5]

that "surplus farmers" in rural Bangladesh can be said to form a social class of "middle peasants" (under current conditions), of roughly equal wealth which enables them more successfully than their less fortunate fellows to emulate the traditionally ideal modes of behavior associated with the maintenance of status. They tend to seek each others' families as sources of mates and, as they often seek to exercise power in their local bailiwicks as *sardars*, *matabbars* or other kinds of "influentials", so they engage in the kinds of ritual and ceremonial endeavors which at once symbolize their unity as "leaders" and regulate the relations between individuals and lineages in the class. Where such relations coalesce in a given geographic area, which territorial demarcation is also buttressed by such factors as relative proximity or contiguity of settlement and location of cultivation land, and the crisscross of kinship ties, the microregion comes into being. Its constituent groupings and their differing memberships and activities, tending to split and separate, yet also unite and aggregate in other contexts, the local populations into a vaguely single socio-territorial unit. This spatial linkage of local "strong points" is given structural and symbolic form in the extensiveness of the political and ritual relations of the locally dominant individuals and families most often representative of the "middle peasant" class.

IV. MARKET AREAS

Over the past ten years, economic anthropology has produced a growing literature on rural marketing and its relationship to society and culture as a whole. Anthropologist students of the economy have striven mightily to disabuse us of a narrowly entrepreneurial view of the marketplace; it is not merely the convenient venue for the passage of 'filthy lucre' from palm to sweaty palm. Markets perform many other useful—if not necessarily more noble—tasks in social and cultural life. Markets, we are told, organize many non-economic activities in and around their hinterlands. They are key nodes in all sorts of communication networks and contribute to the diffusion of culture itself. They often mediate between, or are themselves, bastions of political power. Whether as trysting spots for the amorously dalliant or meeting places for the kinsmen of prospective spouses, markets carry on a great trade in kinship ties. Finally, as if these and other profane goings-on did not seem enough to ask of so "multiplex" an institution, activities of a more sacred character are sheltered and stimulated in the temples, churches, mosques and shrines associated with the world's market places. As we now recognize, marketplaces are more than mere dots on the complicated map of rural life.

Some years ago, in the first of a series of articles whose theoretical import I have found most helpful in thinking about my own research data, G. William

Skinner suggested that in complex peasant "societies," marketing structures inevitably shape local social organization and provide one of the crucial modes for integrating myriad peasant communities into the single social system which is the total society [15, p. 3]. In an application of "central place theory" as elaborated by the economic geographers Christaller and Losch, Skinner showed how the extensions of Chinese peasant political, religious and kinship, in addition to economic, organization worked around what he called "standard marketing communities", the latter to be seen "not only as . . . intermediate social structure (s), but also as culture-bearing unit(s)—the locus in the Chinese case of Redfield's 'little tradition' [15 p. 32].

And in a more recent summary of his analysis, Skinner states that although the standard marketing area was "unambiguously an autonomous economic system, its significance extended far beyond economic" [17, p. 272]. Demonstrating further that process of "change within tradition" were affected and effected by changes within and without rural marketing systems in pre-communist China, Skinner pursued his thesis into the post—1949 period, insisting that "traditional marketing communities have given shape to the Communists' chosen instrument for rural transformation—the "people's communes" themselves [16, p. 339]. Right down through Mongol and Ming, Manchu and Mao, market systems have been both harbinger and helpmate, sometimes of stability, other times of change, in rural Chinese society.

The force of Skinner's analysis of marketing and social structure became quite apparent to me while in the field and I have long thought it relevant to a discussion of rural Bengal. This is not to say that the rural scene in Bangladesh resembles that of China; indeed, as Skinner himself has noted [15, p. 6], "nucleated villages are common throughout most of rural China", the sole "exceptional" area that of the Szechwan Basin, whose overall human geography seems from description to be similar to that of Bengal. Like China, however, rural Bangladesh may be noted for the ubiquity of its markets (*hat*) and, perhaps, may be even more prodigious in the production of small trading centers than its colossal neighbor to the north. Dacca District, for example, had at the turn of the century 343 markets of various sizes. At that time the district was 2,777 square miles in area and contained a population of nearly 3 million, living in 8,956 *mouzas* [1]. It is possible to calculate, then, that an average market served an area of approximately 9 square miles, with a population of 8,600 living in some 25 *mouzas*. Markets in rural Bengal are periodic, as elsewhere in the world, usually "sitting" twice a week; only larger centers of trade, as in the bigger market towns, are daily in operation. The average hinterland area of rural markets as calculated

above can be assumed to overlap territorially with those contiguous to it and the spacing of market days allows rural people to move freely to one or another close by *hat* on nearly any day they choose. I cannot, on the basis of the limited data I now possess, determine whether or not the combination of spacing and periodicity of rural markets allows the neat mapping of hexagonal marketing areas around large market towns, as Skinner [15] has done, but it should not surprise me if this shape of local marketing systems could actually be traced out.

How and to what extent do rural markets in Bangladesh constitute important elements of the rural social system as Skinner has shown that they do for rural China? I can only proceed to suggest something about this, drawing upon my own research data once again.

Lying just to the south of Hajipur and Tinpara there was a small periodic *hat* (market), meeting in all its rustic splendor on Tuesdays and Saturdays of each week throughout the year. Located on less than one acre of land owned by one of the area's largest and most wealthy lineages, until the mid-sixties Alirbazar (my pseudonym for the place) was merely the congregation spot for occasional local sellers of produce who would meet in its southern end just across from the small Muslim school (*madrasha*) which was situated to the north side. When the footpaths which passed for its roads were widened and made more perennially passable by the Rural Public Works Programme of the East Pakistan government in 1963/64, the market place underwent an expansion of its activities. By 1967 it could boast of ten permanent shops, whose owners or lessees included several tea stalls and a couple of purveyors of *pan* leaf cum betel nut, pulses and spices, and other food stuffs.

On a daily basis, nearly all the habitués of Alirbazar, many of whom I soon came to recognize, were from the market's immediate hinterland of some 15 to 20 *mouzas* and their *reyai* or "village" enclaves, none more than 2 to 3 miles distant. An average market day might bring between 35 and 40 sellers and buyers, by my count, these also from the immediately surrounding area. Those among them who regularly engaged in the selling of this or that item had invariably gotten their wares from a supplier in a larger center, usually in nearby Comilla town. This fact, coupled with the further datum that the permanent shops, whose proprietors were also local residents to a man, were also externally supplied, told the tale of Alirbazar's function as a distributive outlet for larger centers' goods. Few persons ever came there to get anything of local produce, except those who needed a little of the rice, paddy, sugarcane or seasonal vegetables, that their neighbors may have brought in small quantity to sell on a particular day. Judged, then, with

reference to the people who frequented Alirbazar, nearby residents with few exceptions the varied goings-on in this market were in most instances strictly a local affair.

The 15 to 20 *mouzas* which formed Alirbazar's hinterland covered an area of perhaps 4 square miles. To its north and south, one or two miles distant, lay two similar markets, whose areas clearly overlapped that of Alirbazar, and peasants in search of more variegated offerings could go to these, or for that matter, to the town. Yet Alirbazar and its hinterland did comprise a vague social unit of sorts.

Not only was the market a central place of all kinds of interaction for those whose homesteads surrounded it. Its affairs were also regulated, especially in the case of conflict and dispute settlement, by the *sardars* of three multi-*mouza samaj* groupings, including that of Hajipur and Tinpara and environs, which I have described above. Nearly 45 per cent of the marriage alliances my genealogical material records in Hajipur and Tinpara, covering up to four generations, crossed the market area as I have delineated it, which, if these two "villages" are typical, means that all manner of ceremonial activity might bring together kinsmen and neighbors constantly in that territory. Marriages then shaded quantitatively into the 107 square mile area of Comilla *thana*, coming to an abrupt halt in territorial scope at its borders, as if the latter marked off the furthest edges of the social world of most of its inhabitants. A person in Hajipur and Tinpara, then, was not unlike Skinner's Chinese peasant "a member of two communities: his village and the marketing system to which his village belonged" [17, p. 272], although I think that it might be preferable in the Bangladesh case to state that the small scale "marketing community" I have described here linked up a variety of "microregional communities" of the sort I have postulated earlier in this essay. That is, to the extent that Alirbazar, as an type of small rural *hat*, constitutes with its hinterland a "standard marketing area" typically found throughout East Bengal, one can argue that such central place organize and link up through their overlapping edges large socio-territorial segments of the Bangalee countryside, thereby giving the lie to its seemingly shapeless visage.

V. SUMMARY AND CONCLUSION

In this paper I have argued that to make sociological sense out of the Bangalee countryside the hunt for the elusive Bangalee "village" must be eschewed. Rather, I have posited that the key to the social organization of rural Bangladesh consists of what I call here microregions, variably constituted territorial communities composed of a mixture of traditional social groupings, of which the several kinds of

entitles Bangalee peasants call "village" may be only one. Processually linked by at least two important principles of organization—the Principle of Clustering Around Strong Points and the Principle of Class-based Extensiveness the microregion takes political, ritual and moral shape as perhaps the uniquely Bangalee expression of *umma Muslima*, Muslim community, itself. Building on the work of G. William Skinner, I have tried to suggest that the traditional system of rural trade loosely unites diverse microregions across larger territories in a manner broadly analogous to that of the "standard marketing communities" he has proposed as major features of the sociological landscape of rural China. Nothing of what I have written here claims to be definitive ; I mean primarily to elucidate what I think may be exceedingly fruitful areas of future research for social scientists willing to contribute to much needed knowledge about Asia's most recent national addition.

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Development Strategy in the Poor Countries

by

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I. INTRODUCTION

There is a need for reassessment of the development strategy, as it was enunciated at the beginning of the second decade. In the first place, this is occasioned by the expected shortfall in external resources and a deterioration in the terms of trade and balance of payments of the poor developing countries. In the second place, it is also occasioned by the need to place a greater emphasis than before on the elimination of mass poverty and unemployment. Since the enunciation of the strategy of the Second Development Decade there is an increasing concern for more concrete formulation of the twin objectives of growth and equity. In fact, the recent economic crisis, with its principal factors as food shortage and inflation, had its most serious effects on the poorest section of the population in the developing countries.

It follows from the foregoing analysis that the Development Strategy for the remainder of the decade has both short run and long run aspects. In the short run, the Strategy must meet the challenges posed by food shortage, shortage of critical inputs like fertilizer and fuel etc., inflation and foreign exchange constraint. It must aim at moderating the impact of the worst effects of the current crisis on the poorer sections of the population. In the long run, the strategy must not only take into account the long run effects of the present crisis i.e., issues and problems which have been brought to the forefront by the present crisis but which will continue to have its impact into the future, but also it must incorporate the lessons of experience in the past few years. The short and long run factors and considerations must be woven together in a consistent framework.

II. SHORT RUN STRATEGY OF DEVELOPMENT

The most important short run problem confronting the developing world is the shortage of food. The short run scarcity cannot be relieved by an immediate increase in availability. On the international plane, the problem is one of a more equitable sharing of the existing supplies, specially on the part of the food exporting countries, the most important amongst of whom are the rich, industrialised

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nations. There is in fact a depletion of the world stocks of foodgrains to a historically unprecedented level at the present time. The rich food exporting nations generally have been following the policy of food sales on a commercial basis to the highest bidder—fetching very high prices in view of scarcity. In the short run, within the developing countries themselves there is the need for efficient marketing and distribution of food in such a way as to relieve the distress of the poorer sections of the population. Can the market and price mechanism accomplish the objective of equitable distribution of limited supplies given the unequal distribution of income, employment opportunities and economic power? The answer is, in all likelihood, no specially since the gap between demand and supply is so great; in fact, there is the likelihood in the short run of a deterioration in the economic circumstances of the poor consequent on the slowing down of growth as well as a possible curtailment of the investment programme directed towards the low income groups.

Many developing countries such as India, Bangladesh, Sri Lanka and Nepal etc. in South Asia have varying degrees of control over distribution, marketing and pricing of food, specially cereals i.e., wheat and rice; the government undertakes distribution and marketing of food obtained from imports and by domestic purchases from the surplus farmers to the urban consumers and the poorer rural population. This policy of procuring food supplies for controlled distribution among the selected income and occupational groups in order to be successful has to fulfil certain rules or criteria. The crux of the problem is how to ensure that the surplus farmers consume less than they otherwise would, given the level of output and their real income. They tend to consume more per capita than the deficit farmers and landless labourers or the urban consumers. There are alternative methods of extracting an increase in the marketed surplus from the farmers; increased taxation of land or of output, increased prices of agricultural inputs such as water and fertilizer or of goods consumed by the farmers, and finally the procurement of surplus from the farmers through a system of compulsory levy, which can be graduated according to the size of the land holding.

In the short run, compulsory procurement from the farmers may turn out to be the most effective method. But the crucial factors are (a) the price at which the procurement takes place and (b) size of the levy. The lower the price, the higher the levy and the greater is the incentive to avoid the levy and the tendency for illegal transactions outside the government's procurement net work. Moreover, both the direct and indirect methods of extracting surplus must take into account the supply response of the farmers in relation to changes in the terms of trade or levels of real income. In the second place, the size and efficiency of the administrative machinery of the government is of

critical importance for its successful implementation. Too fast a displacement of the private marketing mechanism by an inadequate state machinery would be worse than the private market mechanism. Thirdly, the gap between the price paid to the farmers and price charged from the consumers is important, since in a situation of shortage, market prices are high and a low price under the system of controlled distribution would saddle the state with the burden of subsidies. It is, therefore, of paramount importance that the supply of rationed food at subsidised prices is confined to the poorest sections of the population and not necessarily to the most vocal sections. A compromise is often struck between the two sets of considerations depending upon the power structure of the political system and the ability of the administration to successfully differentiate and segregate the various groups of consumers.

Closely related to the problem of food scarcity and that of equitable distribution of the burden of scarcity within the developing countries, is the problem of inflation. Inflation in the poor countries is partly imported through rising prices of traded goods in the developed countries, and is accentuated by the shortage of both imported and domestically produced goods and services. A rise in the prices of essential consumer goods put an upward pressure on wages in the organised labour market, and rise in costs of materials accentuate the rising cost of production. The upward pressure on costs and prices can only be moderated by dampening aggregate demand, by reducing unproductive public expenditure and by reducing subsidies. The attempt to supply essential consumer items (besides food) to the poorer sections of the population at subsidised prices has been far from successful. This is partly because shortage has often been very acute so that if the cost of subsidy has to be borne by the richer sections of the population, the burden on the rich is higher than can be contained within the existing distribution of economic and political power within the society. The failure has partly been due to the fact that access to subsidised essential commodities has always not been exclusively confined to the poorest and most unprotected, vulnerable, sections of the community.

To minimise the adverse effects of an inflationary situation, it is necessary to allow a greater role of credit, monetary and fiscal policy in regulating demand and prices, than has been the practice in the past. Specifically, the disincentive effects on the exports of the developing countries of an overvalued exchange rate have to be offset by an exchange rate mechanism which does not make exports unprofitable. The incentives for productive investment must be maintained and in fact intensified. The interdependence between the rate of inflation in the developed countries and that in the poor countries has been brought forcefully to attention of all during the current economic crisis. If the poorer countries have to pay

for the excess cost of the import bill by increasing real quantity of exports, domestic consumption and investment expenditures must be reduced. The monetary and fiscal policies in this situation must be consistent with the reduction in real aggregate expenditure. The changes in import price inevitably cause changes in relative prices within the economy even if there is no deterioration in the terms of trade. In addition, a decline in the terms of trade adds a new dimension i.e., a decline in the total availability of goods and services. The critical question is not whether, faced with a shortage of resources, domestic demand should be reduced but how and in what directions it should be reduced. The new orientation of development strategy enjoins on the developing world the task of choosing the appropriate structure or composition of the reduced level of aggregate demand, in such a way as to minimise the burden on the poor.

Moreover, the developing countries need to forge new links of trade and aid with the new rich, oil producing countries. There is the need for the establishment of a mutually beneficial triangular relationship between the industrialised nations, the oil producing countries and the developing world. To the extent that the industrialised nations are unable to borrow from the oil producers, the developed countries as a group need to expand their exports in order to pay for the rising import costs of oil; they can expand their exports to the oil producing countries but the absorptive capacity of the latter for both consumption and investment goods, in view of their limited population, lack of physical infrastructure and natural resources, is restricted in the short run. But a substantial expansion of exports is possible to the developing world, where the absorptive capacity is larger than the investment funds available to them internally and from the industrialised nations. The credits extended by the oil countries to the developing countries can finance the necessary expansion of exports of the industrialised nations.

The oil rich countries could contribute to an efficient and equitable international economic order, if whatever funds they directly lend to the industrialised nations or whatever way they participate in international mechanism for recycling of oil funds to the rest of the world, are linked up or are made conditional upon the industrialised nations taking concrete measures for liberalising trade with poor countries and for increasing their assistance. The measures which merit serious consideration should include (a) reduction or progressive elimination of tariffs and non-tariff barriers on exports from the developing countries on a non-reciprocal basis; (b) shifting of labour intensive industries or relocation of industries, no longer considered economic in the industrialised nations, to the poor countries (c) structural adjustment in the industrialised countries and (d) assistance towards

discovering new areas for and increasing the efficiency and reducing the cost of, raw materials exports of the developing world.

III. LONG RUN STRATEGY OF DEVELOPMENT

Whatever growth rates have been achieved in the late sixties and early seventies, and in some countries they have achieved the UN targets, the benefits of growth have not been widely shared. The development strategy, therefore, needs to be reoriented towards specific goals and actions for attack on mass poverty and unemployment. The first element in the new approach would be to formulate the components of a minimum consumption basket for an average family to sustain conventional standard of life at the minimum level, considered socially desirable. This minimum basket may be said to define the poverty line; an increasing proportion of population needs to be raised above this level in any successful anti-poverty programme. The size and composition of the basket may be different between urban and rural areas. The monetary value and composition of the minimum consumption basket would vary over time as prices change.

The second step in this exercise is to determine the percentage of population which must be raised above this level in a given time period. As an increasing proportion of households is assured the minimum consumption basket, the overall economic growth would be accompanied by a corresponding reduction in poverty. The third step would be to identify in concrete terms the sections or groups of population in a country such as landless labourers, small farmers, urban labourers unemployed or employed in very low productivity or sweated occupations, specially in the service or tertiary sector, who are near or below the poverty line. Fourthly, in order to ensure that the minimum consumption basket is indeed made available to the intended income groups or classes of population, it is necessary to formulate and implement development projects and programmes designed to provide employment opportunities and raise the income and levels of living of these groups.

This strategy of development would necessitate a reordering of the priorities of investment programme and the sectoral allocation of resources. The re-orientation of development strategy would emphasize investment in agriculture and small scale industry, producing simple consumer goods. This would not only warrant a larger health, education and housing programmes, but also would change the composition of the social sector programmes in favour of meeting the needs of low income groups near or below the poverty line.

That agriculture and rural development must occupy the pride of place in the new strategy is readily admitted by now; this is the sector where the majority of

the low income people live, and where sources of employment opportunities and rising levels of living for the majority of the population have to be expanded. The promise of "Green Revolution" has not materialised, partly because its potentialities were initially exaggerated. The balance between the expected demand and supply of food is in serious jeopardy, unless renewed emphasis is placed on increasing food production in both the developing and the developed world. The developing countries is faced with a shortage of fertilizers in the immediate future; there is a time lag in increasing the production of fertilizers, given the excess demand for fertiliser plants and the limited supply and rising costs of machinery and equipment. While in the long run, an expanded supply of fertilizers is needed, the strategy of agricultural development in the short run must concentrate on securing the highest returns from the use of fertilizer (a) by ensuring an adequate supply of complementary inputs such as water, appropriate seeds and pesticides, and (b) by using the various types of fertiliser in appropriate doses. It is also necessary to lay greater emphasis on inferior cereals, defined as such since they are usually consumed at low levels of income, which require smaller amounts of fertiliser and lower degree of water management.

The expectations regarding Green Revolution were exaggerated because the technological and organisational requirements of the optimum exploitation of a seed-fertiliser technology were not properly appreciated. The new varieties of rice were not suitable for rainfed areas or for conditions of heavy inundation. The seed technology neither for monsoon rice nor for deep water rice was adequately developed.

The institutional and organisational problems of spreading new technology of the small farmers are considerable as it involves supply of credit and extension services, including supply of training and inputs. The optimum use of irrigation equipment as well as an efficient distribution of other inputs and credit is facilitated by the grouping of farmers for joint action. The experience with cooperatives has been disappointing.

The question of pricing policy for agricultural inputs and outputs for promoting the most efficient use of scarce inputs, on the one hand, and an optimum cropping pattern, on the other, has been neglected in many developing countries. There is an urgent need for an appreciation of the role of prices and incentives in the efficient use of resources in agriculture. With millions of small farmers, even with the best of organizational structure short of radical revolutionary methods of collectives or communes, a greater role than hitherto assigned of the prices and markets is essential. This is equally true of the supply and distribution of credit. The role of institutional credit i.e., state or cooperative

agencies or organised commercial banks, in the rural sector is as yet limited. As equitable distribution of credit can seldom be ensured by methods of rationing and direct control over the supply of institutional credit, because of a very unequal power structure in the rural economy. A high interest rate coupled with an elastic supply of credit would probably lead to a better distribution and use of credit than rationing of credit through existing institutions. If small farmers could be organised into groups and their production activities, including supplies of inputs and credits, were to be integrated with marketing, the physical allocation of credit in kind i.e., inputs to small farmers, might provide the vehicle of providing them preferential access to credit at lower interest rates. The growth of rural cooperatives or association of farmers and landless labourers, is an important ingredient in the emergence of countervailing power among the rural people. The promotional role of the government in the growth of such countervailing power is vital.

Most of the developing countries have not been able to resolve the problem of decentralisation of economic and political powers to the local government institutions. Neither they have been able to solve the problem of participation of the rural poor in the development process. The growth of viable local government institutions and participation of the masses in the development process are inter-related. As the economic power of the rural poor is strengthened by a wider participation in the fruits of progress and in the ownership of assets, their effective participation in the political system of the local government would increase *paripassu*. Whether distributional problems of rural economy can be solved by appropriate pricing of inputs and outputs and by the organisation of small farmers and landless labourers, without far reaching institutional reforms, is open to question. Land reforms have in the past provided a firm basis for successful cooperatives or farmers' organisations.

Closely related to the spread of new technology in the agriculture is the implementation of rural development projects, for the expansion of employment for the rural poor. Public construction activity must be integrated with the development projects in the other sectors of the economy, such as agriculture, transport and communication, housing, health and education projects, as well as such services as marketing and warehousing etc. The choice of technology, including labour intensive techniques, is wider in this field than in the other sectors. In the past rural works programmes were inadequately planned and integrated with the rest of development projects. There was inadequate technical guidance of the rural works programme; there was a lack of supervision and control over the expenditure of funds and inadequate participation by the local people in the planning of projects.

Rural development extends beyond agriculture and rural public works to rural, agro-based industries, providing simple consumer goods in a variety of widely dispersed small scale enterprises. They can work in a mutually reinforcing fashion. A higher agricultural output would expand demand for the output of the rural processing industries. The industrialisation strategy of the past decade has come in for considerable criticism, partly because of its inadequate integration with agriculture and rural development and its concentration in a few urban enclaves; its inability to provide expanding employment opportunities was partly due to the fact that the size of the sector was limited, however, impressive its rate of growth was. Given the very high investment requirements of capital intensive industrialisation, its progress was necessarily slow in the capital short countries. The small scale industries, on the other hand, not only could be owned and managed by entrepreneurs with limited access to capital and managerial capacity—an usual situation in the developing countries—but also they are suited to their small market size. The possibilities of splitting up production processes into activities, some of which can be performed by labour intensive techniques on a small scale and can be dovetailed with other activities carried on a large scale by capital intensive techniques, are far from fully explored.

A most widely prevalent feature of the industrial economy of the developing world is the considerable under utilisation of capacity. Partly this is due to wrong choice of technique, inappropriate factor pricing and fiscal and monetary incentives which are biased towards capital intensity and bigger size or capacity of industrial enterprises. Partly, the reason is the limited size of market, including the market for the by-products of an industry. Much greater attention than hitherto needs to be paid to the requirements of inter-industrial balance and to more reliable projections of demand. In the case of lumpiness of investment for creation of capacity ahead of demand is, however, often unavoidable. Given the acute shortage of investible resources, the utilisation of existing capacity should receive priority in terms of allocation of foreign exchange, training of manpower, balancing of equipment and intersectoral investment allocation; creation of new capacity should be so designed as to contribute to the utilisation of existing capacity. The capacity which is the result of wrong investments in the past or for which there is no prospective demand needs to be discarded or left-un-utilised. The circumstances surrounding underutilised capacity are different between countries; package of policies in each case would be dependent on a thorough investigation of the extent and causes of underutilisation.

Inadequate maintenance and repair of capital equipment is a universal phenomenon in all the developing countries. The physical life of equipment is not only shortened but also there are frequent interruptions of work. Maintenance

engineering is in short supply and its role is inadequately understood. Here is an instance of a divergence between social and private costs and benefits which are very glaring, specially in the public enterprises. Appropriate fiscal and price policies can correct the imbalance and lengthen the life of the physical equipment.

One recurrent theme in the past has been the possibility of utilising disguised or open, unemployed reservoir of manpower as a source of capital formation without a commensurate increase in wages fund but with a minimum necessary input of materials and equipment. This theme has been expanded to include additional labour on the part of the fully employed labour force without payment and outside their normal employment. The students have often been singled out as a source of voluntary labour with motivation to enthuse the entire community. This can be only partially effective even if it can be organised. The contribution of a minimum amount of unpaid labour by every one in the community, from the highest political and bureaucratic leadership down to poorest, unemployed man, subject to limitation of old age and health, can only be inspired and implemented under the guidance of and actual participation by the political leadership at the highest level. The preconditions for the success of such a policy are very stringent. There should be no exception to the contribution of labour and it should be more than trivial if it is to be useful as well as psychologically and socially inspiring. This is in fact a minimum head tax in the form of labour. In addition, there could be an additional surcharge in the form of labour input, which can be commuted by the payment of monetary contribution (converted at the going wage rate for unskilled labour) with exemptions for those below a certain minimum level of income or assets but with a progressive rate, above the minimum level, according to the size of income or assets.

The payments made in commutation of labour surcharge by the more prosperous groups could be used to employ the under-employed and unemployed. However, the employment of wage labour would add to the demand for wage goods, mostly food, which can be met by the payment of surcharge in kind rather than in cash. To the extent that tax in kind releases more food from the producers than would otherwise have been marketed, upward pressure on prices would be mitigated. The mobilisation of labour and its financing on such a scale would have to be linked with the local development projects to be planned, conceived and executed by the local governments. The national governments are to set guidelines, formulate and enforce criteria and methods for project selection and appraisal.

The Development Strategy for the second decade recognised the role of population planning as an integral component of socio-economic development.

Historical evidence corroborates that socio-economic development including improvement in health, education and nutritional standards, leads to a decline in birth rate. However, for the highly populated poor countries such as those in Asia, for example, to wait for a sufficient momentum in the rate of socio-economic development to make a dent in the rate of population growth is not a feasible proposition. The UNConference on population held in August 1974 recognises the close interrelationship between demographic and socio-economic factors in development and proposes a plan of action, among other things, to (1) promote socio-economic measures affecting population growth, (2) to advance national and international understanding of the complex relations between resources, environment, population and development, and (3) to recommend guidelines for population policies consistent with national values and goals and with internationally recognised principles. While the need for a positive policy of population planning is widely recognised, effective and widespread implementation of population planning programmes is lagging behind.

Knowledge about techniques of control over the size of family and means of command over techniques are not widely available. There is an inadequate appreciation of the close interdependence between individual choice regarding family size and social welfare. Positive measures by the state are necessary to bring this awareness to the forefront of individual decision making. The present state of knowledge about the motivational aspects of population planning is far from adequate. The various techniques and institutional arrangements for family planning are as yet in the process of growth and experimentation. The health services, rural clinics, the trade unions, agricultural cooperatives and extension services all of which are at work in guiding, changing or influencing the socio-economic behaviour and attitudes of the population, are the potential agencies for motivation.

In view of insufficient knowledge and inadequate experience in this field, a pragmatic approach based on experimentation with multiple techniques and different institutional approaches is desirable. Continuous research and evaluation of the diverse techniques and institutions must be a built-in feature of all population planning programmes so that results of research and evaluation can be incorporated and programmes continuously adapted.

IV. CONCLUSION

The outlines of a new Development Strategy elaborated above, include a renewed emphasis on a few selected components of the strategy which was formulated at the beginning of the Second decade, i.e., rural development and more income distribution. The spectre of food shortage and growing population has brought the Malthusian dilemma back into the forefront. This points to the critical role

of technological breakthrough and institutional reforms in agriculture. The strategy for this decade must focus attention on self-reliance and domestic mobilisation of resources, specially in view of a possible shortfall in the required level of development assistance and lower than anticipated rate of growth of income. The challenge of domestic resource mobilisation, partly by stimulating a wider sharing of sacrifices in current consumption, is all the greater in view of the suggested policy of more equitable distribution of income. A fuller utilisation of existing capacity, an improvement in management and organisation and a much greater care in the repair and maintenance of capital equipment are all simple-minded but nonetheless difficult to achieve, critical policy recommendations deserving immediate implementation.

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 in Terms of the Takeover of the Wholesale Trade in Foodgrains:
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CONTENTS

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Presidential Address—

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Subject I—Wages and Incomes of the Weaker Sections in Rural India ..	G. Parthasarathy
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CONTENTS

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CONTENTS

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Morris David Morris and Clyde B. Dudley

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THE BANGLADESH DEVELOPMENT STUDIES

Volume III

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Number 4

Articles

A Social Cost Benefit Analysis of the Tea Industry of Bangladesh

Nuimuddin Chowdhury

The Seed-Fertilizer Technology and Surplus Labour in Bangladesh Agriculture

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Rafiqul Huda Chaudhury

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The Bangladesh Development Studies

Volume III

October 1975

Number 4

Articles

- 379 A Social Cost Benefit Analysis of the Tea Industry of Bangladesh
Nuimuddin Chowdhury
- 403 The Seed-Fertilizer Technology and Surplus Labour in Bangladesh Agriculture
M. Muqtada
- 429 Fiscal Financial Intervention, Factor Prices and Factor Productions : A Review of Issues
Shankar N. Acharya
- 465 The Local Government System in Western Nigeria : A Comparative Evaluation of Performance Under Civilian and Military Regimes
W. A. Ajibola and T. A. Oyejide
- 479 Attitude of Some Elites Towards Introduction of Abortion as a Method of Family Planning in Bangladesh
Rafiqul Huda Chaudhury
- 495 Capacity-utilization of Deep Tubewell Irrigation in Bangladesh : A Time Series Analysis of Comilla Thana
Mahmudul Alam

Review Article

- 505 Education, Manpower and Development in South and Southeast Asia
Mohiuddin Alamgir

Book Review

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A Social Cost Benefit Analysis of the Tea Industry of Bangladesh

by

NUIMUDDIN CHOWDHURY*

I. INTRODUCTION

In a country with large and widespread trade taxes and subsidies, or import restrictions, and with various factor price distortions and a severe fiscal problem, it is misleading and often socially wasteful to evaluate projects at market prices because they poorly reflect true scarcities. Project evaluation is then necessary at prices free, as far as possible, from these distortions. Basically, unskilled labour, savings, foreign exchange and income distribution are recognised as needing correction because of a distorted price mechanism. In their well-known but controversial Manual [27], Little-Mirrlees first proposed that a shadow price system based on world or "border" prices should replace the market price system.¹ Considerable impetus towards micro-planning on their proposed lines has since been generated. This study is a limited attempt at applying their framework to a tea garden in Bangladesh.

The purpose of this paper is to determine the extent, if any, to which market rates of return to tea production in Bangladesh diverge from the like social rates. If significant, the divergence will imply that the government should adjust its fiscal policy in appropriate ways, for otherwise resources will tend to move out of what is socially a profitable industry. The paper is divided as under : Section II contains brief introduction to the tea industry of Bangladesh. Section III seeks to prove that, of all available methods, the Little-Mirrlees Manual may yet be the easiest and the most practicable for the actual conditions in Bangladesh. Section IV outlines our methodology of evaluating output and inputs of the sample garden

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¹Although they have published a thoroughly revised second edition [26] hereinafter we shall refer to them by way of the Manual, since the fundamental ideas have changed but little.

and presents the results. The study ends with a focus on the summary and conclusion.

II. THE TEA INDUSTRY OF BANGLADESH

Contributing an approximately 1% of manufacturing value added, the tea industry is of considerable importance from balance of payments standpoint, it generating about 4% of the country's export earnings. The industry, substantially, is owned in England; in 1970 the so-called Sterling gardens produced 56% of best Bangladesh teas on 47% of its tea area.

Table I presents certain economic aspects of the industry, namely, productivity, capital intensity, profitability, surplus accumulation, the information being based on a sample of 12 gardens [9].

The industry as of the mid 1960's privately has been quite profitable. There has been a certain labour lay-off and some increase in output per worker between 1970 and 1974. And yet, as we shall see, the industry as a whole is now facing very low rates of market return. To summarise, while the low tax and saving ratios of Bangladesh [3] argue convincingly for a relatively high estimate for s , which in Manual terms is the social value of saving in terms of present consumption, the fact is that poverty is so widespread [2;7] that no possible growth of future consumption can compensate for present consumption which is foregone. That is, intertemporal distributional considerations dictate a low s . We have accordingly computed social rates of returns for both high and low s .

TABLE I
CERTAIN ASPECTS OF SELECTED GARDENS OF BANGLADESH
TEA INDUSTRY

Description	1970	1974
1. Area Under Tea (acre)	17343	17343
2. Crop (million lbs)	13.93	13.95
3. Permanent Labour	18210	17398
4. Man/Land Ratio (man/acre)	1.05	1.0
5. Yield Per Acre (lbs)	803	804
6. Output Per Worker (lbs)	765	802
7. Capital Per Worker (current price)	1903	n.a.
8. Net Profit after Tax/Net Worth ^a	16.6	n.a.
9. Dividends/Net Worth ^a	14.4	n.a.
10. Retained Earnings/Net Worth ^a	2.33	n.a.

Note : a=average for 1965-70,

III. A JUSTIFICATION OF THE MANUAL IN THE LIGHT OF SOME OF ITS CRITIQUE AND COMPARISON WITH ALTERNATIVE COST-BENEFIT METHODS

The Manual's basic contention is that, in developing countries, true opportunity costs of any two goods or factors are to be sought not in their relative domestic prices, but in the relative terms on which they are actually, or can potentially be traded. That is, relative f.o.b. prices plus shadow handling charges are shadow prices for exports and exportables; relative c.i.f. prices, for imports. Where foreign trade elasticities are imperfect, marginal export revenue and marginal import cost become the relevant border prices. Such a shadow price system naturally emerges from Manual authors' the proposed numeraire: government saving in free foreign exchange; and from the Manual authors' presumption that commodities, as a general rule, are fully traded. A commodity is fully traded when increases in supply and demand affect the balance of payments only. Clearly, then, border prices are the accounting prices even given imperfect trade elasticities. Goods which are optimally nontraded because of very high transport costs are to be evaluated by breakdown of cost into labour and traded components which, in turn, may be appropriately evaluated, the assumption being that fully traded cost of any commodity can ultimately be derived, as long as nontraded goods are subject to constant returns to scale. Full tradeability is a considerably weaker assumption than free trade and is consistent with a constant tariff or subsidy and even quantitative restrictions. Also, even a nontraded good is fully tradeable if it is highly substitutable with another which is fully traded. Where full-tradeability assumption is invalid, either because wide-ranging import licensing prevails or because foreign exchange management is so bad as to starve domestic capacity of needed materials or because demand-created excess capacity obtains, the evaluation should follow the same lines as for optimally nontraded goods. Thus correcting for distortions from trade controls, the Manual proposes evaluating savings and unskilled labour at their social costs. The shadow wage rate (SWR)² is an estimate of the social cost of labour recognising both the differential productivity of labour in agriculture and industry and the effect of extra employment on total saving. The accounting rate of interest (ARI) is an estimate of the social opportunity cost of capital. Of course, this oversimplified account of the Manual methods necessarily glosses over the practical difficulties and controversial value judgements underlying the methods, which are recognised and dealt with by the authors [26] and by some of the articles in [8].

²SWR will hereinafter denote both shadow wage rate and ratio of shadow wage rate to market wage.

A Critique of the Manual

While agreeing that, "The Little-Mirrlees international price prescription has helped to highlight the costs of excessively protected industries—which can be easily disguised as highly profitable if domestic prices alone are considered" [36], the critics have pointed out that the Manual lacks a precise statement about the assumptions that are being made about government policy and about the implications of those assumption [21]. In particular, even assuming the government rational, do the rational shadow pricing rules, in the presence of multiplicity and complexity of objectives and constraints on both volume of tax-generated savings and pattern of taxation, approximate closely to the Manual rules in their simple form [18]. Not necessarily. If, moreover, far from the Manual's assumed independence for the government of local power groups, the government itself is an integral part of the political economy and furthermore is committed to a clear strategy of reducing trade dependency, by producing strategic outputs (such as steel, cement, refining) which are subject to economies of scale, in the public sector itself, then there will arise serious operational problems for the Manual. In fact, this consideration, and the difference between the nature of the public investment system as envisaged in the Manual and its real nature, has been argued to be a major difficulty, in Latin America in any case, for any cost-benefit approach [15]. The rather strong assumption made about a coordinated and rational policy making within less developed countries is implicit also in the treatment by the Manual of commodities as generally fully traded, save in clearly exceptional cases. This assumed rationality of developing country governments in the face of extensive quota protection and the inefficient tax structures of most of these countries has generally been called into question. In other words, project evaluation must take place in the context of the existing, rather than some optimum, situation.

In our view, while these criticisms have more or less validity depending on particular economies, they can usually be taken into account in evaluation work, admittedly, at the expense of the distinctive simplicity of the Manual. In fact, the primary question on which the utility of the Manual must be judged is whether or not the category of fully traded goods is relatively large or small in a country. The former is likely to be the case in relatively open economies. But the method is applicable even in relatively closed economies in that evaluation of non-traded or partially traded goods involves only computational difficulties which, in our view, can be tackled with progressively greater ease as experience with the method grows. In fact, the extra time involved in the Manual method vis-a-vis evaluation at market prices can be substantially reduced if several analyses proceed simulataneously [35]. In fact, as we argue later, compared with

alternative methods of project evaluation, it may be the easiest and yet the most accurate in relatively open economies.

A Comparison of Manual with Other Project Evaluation Methods

Four different methods have so far been proposed to evaluate projects in the face of widespread distortions. Apart from the Manual, there is the UNIDO Guidelines [39], the so-called "domestic resource cost" or Bruno method and the "effective rate of protection" (ERP) method. Basically however the latter two are shortcuts and deal only with trade distortions, although, in their unmodified form, the ERP measures could be very misleading and their use as a project appraisal test is unjustified. Modifying them however yields a similar test to domestic resource cost method [24; 26]. But this latter is a fairly limited method, not least because it makes no allowance for labour market disequilibrium or for a shortage of savings, both being important for Bangladesh. We thus can safely concentrate on the UNIDO Guidelines as an alternative to the Manual.

Perhaps the most fundamental distinction between the two arises from respective numeraires which lead to different discount rates. Guidelines have consumption as numeraire and thus multiply project's effect on saving by s ; the Manual has government saving as numeraire and thus divides project's effect on consumption by s . Save this difference, the formal analysis of the two methods is identical. Both take trade and nontrade distortions into account, calculate accounting prices to correct them, treat externalities, risk and inequality in about the same manner. In principle, the project ranking on the two method would be identical, given same assumptions about economic structures and future trade possibilities. In practice, the Manual may be easier to apply. One criticism of the Manual can be dismissed out of hand. It is wrong that it requires extra information beyond other procedures. In fact, all known project evaluation procedures named above, if applied properly, need estimates of the border prices of tradeable commodities [24]. On the other hand, the Manual's proposed accounting ratios for individual commodities tackle the often highly differentiated protection structure of developing countries much better than the Guidelines' shadow exchange rate (SER). Since this SER is an average over the multiple exchange rates which operate, calculating it in practice becomes a very difficult task since the weights of individual goods are very difficult to establish. In practice, therefore, an SER is usually calculated by determining the fractions of marginal foreign exchange earning which lead to particular imports and/or reduction in particular exports, the basic conception being a strict exchange control regime. This however assume that marginal foreign exchange is spent in an iniform way, while in fact the fractions would frequently depend on whom extra spending power accrued to in the first instance

[33]. Moreover, directly or indirectly, marginal consumption expenditures involve the use of unskilled labour and capital (some of which imported); the Guidelines' SER is, however, bereft of any such allowance. Finally, the Manual method has a significant diplomatic advantage compared with Guidelines, since governments would not take kindly to project evaluation on the basis of a SER considerably lower than the official exchange rate for it would amount to a public acknowledgement of a wrong exchange rate. The Manual would achieve the same result without embarrassing the government.

Relevance of Manual Methods to Tea Industry

To see this relevance, we take the output of our project first. Tea is a predominantly export crop, domestic consumption being about 10% of total output and a declining proportion thereof at that. Supplying only about 5% of world supply, the demand curve facing Bangladesh is effectively perfectly elastic, especially given the prospects for future demand conditions. Since Bangladesh produces plain teas of a relatively homogeneous quality, the importance of selling costs as a determinant of export possibilities is comparatively very little for the small producer that she is. For tea, tariffs and quantitative restrictions have virtually been removed by most developed countries and the outlook for trade liberalisation is much brighter than, say, for coffee [14]. Finally, although barter agreements in tea are important, they constitute no insurmountable difficulty for the Manual because there is a regular re-switching of goods, imported under barter, to hard-currency markets and if, as is the case here, it is possible to obtain the freely convertible earnings implicit in any particular barter-deal. In short, the factors which could conceivably render the output less-than-fully traded [20] are not important in our case. On the input side, important inputs e.g., coal, oil and oil derivatives, spare parts, agro-chemicals, aluminium linings and fittings, paints are directly imported. The demand for the other, though quantitatively much less important, inputs are met partly from domestic production and partly from imports. Another important input, plywood sides and plywood ends, used in teachefts have been assumed optimally exported (see below). As regards the partially traded commodities, i.e., cement, C.I. sheets, fertilizers, by far the larger proportion of total supply consists of imports, and Bangladesh has been argued to better import them [22]. So inefficient is indeed the domestic production of cement and C.I. sheet and so wide is consequently the spread between the price of the domestic vis-a-vis imported variety that the 1974 budget has imposed heavy tax on the latter so as to bring prices in line [16]. Our evaluation of these inputs assumes (controversially) optimal conditions, although of these inputs only fertilizer enjoys sizeable consumption, the others being quite insubstantially consumed. We shall argue that these

activities do not qualify for the infant-industry argument for protection because they are basically based on imported raw materials, especially C.I. sheets.³ Moreover, the tea industry's demand for electricity is very small and met by diesel-run motors and that for steel met by imports. The difficulties of scale economies are thus not important.

The fact remains that Bangladesh is subject to comprehensive import licensing and thus use of an input at the margin would affect trade only if the quotas are flexibly operated, for otherwise there will be supra-trade effects, rendering necessary evaluation of changes in consumers' surpluses allowing for tax/subsidy structure. We have assumed the quota operation will be perfectly flexible on the following basis : (1) There is evidence that Bangladesh has substantial possibilities of export expansion in leather, jute, newsprint, frozen shrimps and prawns, spices, given suitable market organisation [3; 12]. These favourable conditions have presumably further brightened since oil-led commodity boom. Our above assumption is primarily based on an assumed vigorous export growth.(2) There is a real possibility of an oil-strike in the Bay of Bengal where exploratory drillings were sanctioned following contracts with four important U.S. oil interests. Preliminary expectations of a substantial strike are very strong and, if they materialise, may make possible considerable trade liberalisation within the existing institutional framework. (3) The prospects of aid, especially concessionary aid from such institutions as IDA, are brighter in the years ahead.(4) And finally Bangladesh has pursued significant import liberalisation even within the import licensing framework. While import allocations against entitlements have uniformly been at 100% in the first half of 1973 and later, the so-called raw material replenishment scheme will allow export industries additional import allocations of varying proportions of f. o. b. export values [19]. Taken together, these factors suggest that the assumption that inputs to tea industry in future are effectively fully traded is quite valid.

IV. THE DATA, METHODOLOGY OF EVALUATING INPUTS AND OUTPUT AT APPROPRIATE PRICES, RESULTS

Data

The data were collected during 1973 and 1974 through visiting the garden's head office and a field trip of 6 weeks in July 1973. Our access to data

³One can, cogently however, argue that in view of the learning effects of industrialisation, an industry, even if initially based on imported raw materials, may still qualify for protection on the assumption that the learning effects will reduce its import coefficient. Moreover, the domestic production of these inputs, in spite of the short-run economic costs, tends to be characterised by substantial backward linkages. The use of the backward linkage concept in determining investment priorities, however, is subject to serious conceptual and estimation limitations. See [41].

has been almost absolute, including, quite often, highly confidential data. A remarkably detailed accounting system, all revenue expenditures being functionally classified, permitted the construction of fairly accurate cost structure. On-garden revenue expenditures were supplemented by data on managerial, head-office and overseas expenses, apart from selling, transportation, marketing, depreciation and financial expenses. Again, a thorough picture of material input consumption in physical terms emerged from garden abstract of stores. Where it was difficult to record physical consumption, the relevant input having been used in different physical inputs or of different qualities, consumption values were recorded. Invariably, these cases were relatively unimportant. The above abstract also provided price information. The recorded market prices are 1973 averages.

Cost Structure and Functional Classification of Cost

The following two tables have provided the basis for evaluation of inputs at shadow prices.⁴ While the identification of unskilled labour costs were straightforward, we allocated costs to skilled labour on garden on certain assumptions. One operation involving skill is machinery repair and maintenance. It has, for example, been assumed that skilled labour and material costs figure in machinery repair on a 60:40 ratio. And so on for vehicle maintenance and others. Skilled labour payments off-garden includes managers, executives and

TABLE II
ESTIMATED COST STRUCTURES, SELECTED GARDEN, 1973
(Tk./Lb)

Item	(Tk./lb)	Proportion of Total Cost Per lb.
Cultivation, Planting	0.25	.103
Manufacturing	0.40	.165
Tea Chests	0.16	.066
Selling, Transport	0.24	.099
Administration, Welfare	1.20	.495
Financial Expense	0.05	.020
Depreciation	0.12	.049

Source : Adapted from N. Chowdhury [9].

Note : The basic table in [9] was exclusive of Managing Agency Commission, because at the time it was drawn up a revision of the Commission rate was reportedly under consideration. The old rate 2% of the gross sales is adopted here because the proposed change never came off.

⁴Units of account were free 1973 foreign exchange in government's hands convertible at the official rate.

TABLE III
FUNCTIONAL BREAKDOWN OF TOTAL COST

Item	Cost	(Taka)
		Proportion of Total
Labour, Garden		
a) Unskilled	1279034	0.498
b) Skilled	86441	0.033
Skilled Labour : Head Office, Overseas	210478	0.082
Material Input Cost	515336	0.200
Accruals to Government	58678	0.023
Transport, Marketing, Agency Commission	222810	0.086
Depreciation	127320	0.049
Interest	53050	0.020
Miscellaneous	14473	0.005

salaried staff at head office and those overseas. Material input cost includes all inputs consumed on gardens or at head office. Accruals to government include rents, rates, taxes and tea cess—all being transfer payments to the government. Marketing costs refer primarily to payment to warehouse and brokers. Agency commission refers to charges by managing agents. The others are self-explanatory.

Shadow Pricing of Inputs-Labour

The single most important input is unskilled labour. We shall thus devote a good deal of time to estimating SWR. The best thing is to specify a likely range for it, for SWR involves us in the difficulties of estimating marginal product of labour in alternative employment and in the controversial estimating of s , not to speak of the fact that marginal product may fluctuate both intra-year and overtime and be less than output foregone if marginal industrial employment causes departure of more than one farmer. That is what we have done. For now, we examine opportunity cost of labour employed on our garden. We shall argue that this labour has an opportunity cost of zero. The tea workers, called "Santhals", are technologically, physically, religiously, linguistically a different people from Bangalees. Their intra-group affinity is unusually strong : for example, extra-group marriages are unheard of. A minority and culturally conscious of a separate identity, they zealously, even aggressively, live as a self-contained entity. Even their consumer purchases are governed by racial considerations, there being bi-weekly "hats" (local markets) where

traders, again from the group, sell necessities. Devout Hindus, they regard Muslims as untouchables and shun them. Given such strong racial feelings, employment on hired labour market will be determined by racial and not productivity considerations and tea workers will be unable to compete with Bangalees, since employers are by and large Muslim Bangalees. This is not the first time that the issue of employment, determined by extra-productivity factors, has been raised.⁵ The tea workers may be outcompeted on economic grounds as well: their real or perceived marginal physical product vis-a-vis their local competitors may be quite low. Agricultural operations in the predominantly rice-growing tea districts are associated with considerable learning by doing, especially as transplanting, quickly but effectively, and weeding are quite delicate processes—processes which the tea workers, accustomed to a fundamentally different work-pattern, will surely take time to negotiate. While this is not to suggest that farm operations are beyond the tea workers, the fact is that they will always lag behind competitors and will, *en masse*, be competed out. Finally, the potential labour supply of the worker may be zero. Given the strong intra-group affinity, even perpetual dependence on a relative's income may be possible. As long, therefore, as the expected income from hiring himself out is not greater than this present income as a transfer payment, a tea worker will not offer his services and expected income has already been argued to be nil.

A Likely Range for s in Bangladesh

The Manual determines s in the framework of a long-run programming model, the basic idea being to project the returns of a marginal project up to a distant future, say T , when the saving-consumption balance of the economy is about right and discount it to present at the consumption rate of interest (CRI). A very crude formula is

$$s = [(1 + 1/2)(r - i)]T \quad \text{where } r = \text{ARI} \\ i = \text{CRI}$$

Again, it is realistic only to postulate a range for s . Now r is in principle the internal rate of return of the marginal project at shadow prices. While such a definition is of little practical help, the real external rate of lending may be assumed to constitute a lower limit to the likely range for r . We believe that Bangladesh can lend abroad at minimum real rates of 10%. Khan's basic solution, on the other hand, generated an ARI of 15.9% in his intersectoral model of accounting prices of Bangladesh [22]. Thus 10 to 16% seems a likely range

⁵In this connection, see [11] and also [35] which indicate that labour market in Kenya is imperfect at places because of unwillingness to hire other tribes.

for r . It confirms the basic conclusion of this study to find that the social rates of returns, presented later, are significantly in excess of private returns whichever ARI we use. We have assumed an ARI of 15.9% for our purposes.

Estimating CRI for Bangladesh

This estimation follows a formula of $i = (1+g)^e - 1$ where g = growth rate of future consumption per capita and e = elasticity of marginal utility of a constant elasticity social welfare function, with per capita consumption as the argument.⁶ Now during 1960-70 real per capita consumption grew at 0.9% annual by [4]. Given the continuation of this trend, we have an estimate of g . An optimist may argue that this dismal consumption performance is due to the essentially exploitative nature of Bangladesh's association with Pakistan and that future consumption will grow much faster, say, at 1.5% annually. In the last place, a pessimistic estimate of g may be 0.5%. We shall compute CRI on each of these assumed rates of consumption growth. Following Lal [23], e has been computed at -4.46 assuming following parameters:^{7, 8}

Income elasticity of food demand = 0.58

Unadjusted price elasticity of food demand = -0.42

Average propensity to consume food = 0.50.

The estimates of g 's and e yield the following estimates for i :

$i_1 = 2.2\%$ when $g = 0.5\%$

$i_2 = 4.08\%$ when $g = 0.9\%$

$i_3 = 6.8\%$ when $g = 1.5\%$.

Assuming T to be 50 years, we arrive at the following range for s , on the basis of the formula above.

$s_1 = 27.4$ when $i = 0.5\%$

$s_2 = 17.6$ when $i = 0.9\%$

$s_3 = 9.2$ when $i = 1.5\%$.

⁶Consumption maximisation appears to be the predominant objective of the Bangladesh government, such other objectives as maximisation of terminal capital stock, reduction of external dependency, national power and prestige not being practically important.

⁷Our elasticity estimates are hypothetical and based on Rudra's estimates of all-India demand elasticities [32]. The hypothesising was a last resort given the nonavailability of any satisfactory estimates of food demand coefficients for Bangladesh. Perhaps the only effort to estimate a demand function for Bangladesh produced highly unrealistic results due primarily to imperfect data [5]. Our income elasticity is assumed to exceed Rudra's to take account of the fact that both per capita income and urbanisation levels of Bangladesh are lower than India's.

⁸It must be readily conceded that any estimate of elasticity of marginal utility must, because of non-measurability of utility, have very little practical meaning.

Shadow Wage Rate in Tea Industry

The Manual formula for SWR of $m+(c-m)/s$ boils down, the opportunity cost of labour being zero, to $SWR=c-c/s$ where c is worker's consumption at border prices. Nothing published exists on consumption pattern of tea workers in Bangladesh. The published results of household expenditure survey for rural and urban Bangladesh were deemed poor proxies, given the assumption that ethnological differences also imply different consumption bundles. Fortunately, results of a fairly comprehensive, albeit out-of-date, Indian survey of expenditure patterns of tea workers in Assam were on hand. This survey is a reliable indicator for our purposes, given the ethnic homogeneity of tea workers in Bangladesh and Assam (Table IV). It may be asked if the relative prices facing Assamese workers in 1958 were the same as those facing Bangladesh workers in 1973. If not, we could not apply accounting ratios (AR) for Bangladesh to these proportionate expenditure components to arrive at desired consumption at border prices. But we argue that, whatever the actual relative prices, the effective relative prices facing the two groups of workers may have been quite similar. The fact is that the English tea house, which owns our selected garden, owns a large number of gardens in Assam. In both countries, the company seeks to enable workers to maintain a certain minimum consumption level and, to this effect, subsidise wheat, lighting oil, cotton textiles and provides free accommodation. Together the first three items account for over 50% of (workers') budget (see below). There are reasons to believe that the relative rates of subsidy for these commodities in the two countries are roughly the same. Given this, for the larger half of workers' budget, the effective relative prices for our two groups are the same. We have assumed that relative prices for the other items were the same in both countries.

In market prices c has been estimated at about Tk. 3.07 per day for daily-rated permanent labour. Separate SWRs for men and women were not calculated because there is no reason to suppose any productivity differential and since women wages are only Tk. .05 less. Employment of casual and adolescent labour has ceased totally owing to a determined effort to bring man/land ratio from the high 1.05 to the Indian standard of 0.9. Applying our estimate for c in border prices and those for s we have three initial estimates for SWR.

$$SWR_1 = \text{TK. } 1.86 \text{ when } i = 0.5\%$$

$$SWR_2 = \text{TK. } 1.82 \text{ when } i = 0.9\%$$

$$SWR_3 = \text{TK. } 1.72 \text{ when } i = 1.5\%.$$

The shadow wage rate as a ratio to market wage in these three cases would be respectively 0.607, 0.594, 0.562. Given an ARI of 10% and the same T of 50

years, the SWR for the above estimates of CRI would be, respectively, 0.57, 0.51 and 0.36.

Land

The land involved is very specific—about 80% of the tea-area in our garden being on fairly steep hillocks called tillahs. The relevant opportunity cost is the net value of the use to which this land would otherwise have been put. Now although uncleared land in the thickly forested and risky tea districts probably has a zero opportunity cost, cleared tea-areas are surely valuable assets and have a certain supply price. Moreover, land supply in our context can be augmented and data for the selected garden for 1970 provided us with a basis for calculating

TABLE IV
PROPORTIONATE EXPENDITURE PATTERN OF TEA WORKERS
IN ASSAM, 1958

Item	%	Accounting Ratio (AR) ¹	Total
1. Cereal, Cereal Substitute	42.05	.700	29.44
2. Milk, Milk Products	2.31	.480	1.11
3. Edible Oil, Fat	3.38	.554	1.87
4. Meat, Egg, Fish	4.15	.480	1.99
5. Sugar, Sugar Products	2.45	.354	.86
6. Tobacco, Alcohol	2.01	.300	.60
7. All Other Food	13.89	.449	6.23
8. Clothing	8.16	.572	4.75
9. Fuel, Light, Household Goods	6.63	.750	4.97
10. Miscellaneous Manufactures	14.97	.750	11.23

¹ AR for item 1 has been directly computed by comparing 1973 market and c.i.f. prices for wheat which is the staple cereal for tea workers both in Assam and Bangladesh. Most of the ARs are from Khan's basic solution [22]. These ARs refer to the mid-60's and their use in this study is justified since internal relative price structure has remained largely unchanged (owing to the largely unchanged fiscal and quota structure and to the fact that the economy did not undergo the kind of structural change which could significantly affect relative prices).

In the second place, we will assume the relative world price structure facing Bangladesh to have remained the same. It should be noted that the inflation of oil prices took place towards the end of 1973. For convenience, its implications for relative world prices have been ignored. Items 9 and 10 have been evaluated at an arbitrary standard conversion factor (SCF) of [0.75] and items 2 and 4 at the AR for "all other agriculture".

Source : [37].

the supply price in shadow prices. (There was no new planting in 1973.) A detailed breakdown of the cost of extension planting into clearing, staking and pitting, manures, soil preparation, road and bridges, fencing was available. It was found that 85% of the cost was for unskilled labour, the remainder being ascribed to nontraded items, e.g., manures and construction. Since wages between 1970-73 have remained the same, and assuming that nontraded costs had risen by 15% in the three years, we arrived at an extension cost of Tk. 462 per acre in market prices for 1973. Applying appropriate ARs for different inputs yielded an estimated shadow supply price of Tk. 273.27 per acre. Although this supply price is likely to be an increasing function of supply of cleared acreage (owing to the need to clear progressively inaccessible areas), we have ignored this complication and built the above supply price into our calculation of social costs of land.

Other Inputs

Some of the relevant material inputs have already been noted. Besides, the garden uses certain nontraded inputs, e.g., firewood, agricultural implements, timbers, lime, bricks, organic manures. It was possible to derive accounting ratios for coal, all petroleum products excepting lubricants, all fertilizers, cement, C.I. sheets, by comparing 1973 market and o.i.f. prices. The plywood sides and ends have been assumed to be optimally traded since Bangladesh has a large stock of pine forest in Chittagong Hill Tracts capable, given determined selling efforts, of competitive export. Notably, plywood, enjoying wider use for wall-panelling and decorative uses in construction and furniture has very favourable demand conditions, especially in North America, whose growing demand is being increasingly met mainly from Asian exports [13]. Such imports grew by 30% during 1971/72 alone. For simplicity, the market prices for these two items have been assumed equal to their likely f.o.b. price, inclusive of shadow handling charges. Spare parts and components involved in machinery repair and vehicle maintenance have been evaluated by accounting ratio for machinery (.572) and transport equipment (.579), taken from Khan [22]. The remaining inputs were evaluated at the SCF and accounted for about 21% of total material cost and only 4% of total cost of production. SCF is intended to measure the extent to which domestic price level differs from what it would be under conditions of free trade with a balance-of-payment equilibrium. In relatively open economies, the main calculation for the SCF involves the average tariff level. Where, however, direct controls are important, as in Bangladesh, the structure of incentives for domestic production of different kind of goods and the relative prices as implied by tariff structure may not only understate the general level of protection but also misstate the relative degree of protection given to different

goods [25]. Some light on the likely range for SCF was gathered from the mid-60 estimates of the average spread between the wholesale prices for different imported commodity groups and their landed costs in Bangladesh, due to Pal [28]. For consumption goods, raw materials and capital goods respectively, the average mark-ups were respectively 51, 40 and 38 per cent. On a somewhat slender basis, these mark-ups may be assumed to suggest SCFs of 0.66, 0.71 and 0.72 for the three commodity groups for the 1960s. We have used a preliminary estimate of 0.75 for SCF (The rate of returns are quite insensitive to variations in SCF anyway). While recognising that SCF of .75 presupposes quite low level of protection and that the true SCF for Bangladesh may be lower, we postulate .75 as this would tend to bias downward our rates of return.

The c.i.f. Prices

In Bangladesh, the government sector dominates import trade [19]. Although commercial importers operated, one cannot depend on c.i.f. rates supplied by them, given the likely upward biases due to over-invoicing [40]. We therefore had to obtain c.i.f. information from government ministries and other nationalised sector corporations which import. Here the difficulty was that various agencies often import the same commodity at different rates. Often these discrepancies were substantial. C.i.f. rates may widely diverge especially when import contracts are on tender, as for fertilizers, which result in a certain amount of price flexibility, with smaller lots usually commanding the highest prices. The border prices will also vary depending on whether shipment is made by a regular cargoliner, which calls at routine ports and hence is more expensive of freight, or by a chartered vessel, which makes a bee-line and is cheaper. Moreover, the chartered market itself goes up and down all the time. For example, a normal consignment of 20,000 tons of fertilizer from Liverpool to Chittagong involved in 1973 a basic freight rate of \$57.5 per ton, while the corresponding chartered rate might have been as low as \$30. The reason why all shipments can not be made by the cheaper, i.e., chartered vessel, is that the latter is available only subject to a minimum size of shipment and that not all shipments of Bangladesh meet this condition. Another source of constant flexibility is the Currency Adjustment Factor (CAF), which is to protect the shipper from exchange depreciation and fluctuates almost hourly. Yet another factor is the so-called port surcharge which often widely varies between ports. As at March 1975, this surcharge has been 5% of the so-called Principle I (basic rate + CAF) for the port of London, but 25% for Liverpool. This surcharge is paid by the consignee. Thus the establishment of an accurate c.i.f. rate for a particular commodity for a country must take into account the volume, the mode and the port of shipment, and the CAF in force—a clearly tall order in practice. But again, with experience, fair precision

in these estimates is definitely possible. Our c.i.f. rates are, wherever possible, weighted averages of reported c.i.f. rates, the weights being volumes imported by reporting agencies. In some cases, e.g., coal, C.I. sheets, we had only one observation for the whole of 1973. While the resulting estimates may be very unsatisfactory, they are relatively unimportant coal and C.I. sheets not adding up to even 1% of total input cost. In short, our c.i.f. estimates are quite approximate, even though the best ones given the difficulties of obtaining detailed information through correspondence.

Skilled Labour

The skilled man or administrative worker, it may be argued, is paid according to his marginal product which, in principle, is equal to his opportunity cost. But developing countries also have sizeable unemployment of young persons with secondary education, precisely those people most likely to go into salaried employment. While the precise extent and composition of 1973 unemployment in Bangladesh is not available, there is good reason to believe that educated-unemployed exist and that, therefore, for some skilled persons alternative marginal product may be zero. One thus ought to know for what proportion of total salaries is the alternative product zero. Since, however, such proportion is unknown at present, but also since due to ignorance of relevant magnitude, any accounting ratio for skilled labour must be controversial, we have adopted the convenient AR of 1. While the implication that entire skilled labour costs affect foreign trade is probably unjustified, 1 is the upper limit of a likely range for AR of skilled labour. And again, apart from convenience, it will bias our results downward rather than upward.

Capital Services in Shadow Prices

The market price depreciation, taken from internal accounts is a much more reliable indicator of true capital charges than if taken from published balance-sheets. Moreover, available was a detailed statement of fixed assets of the garden prepared for fire insurance premium purposes. In 1973 prices, it is as under :

TABLE V
FIXED ASSETS ON SELECTED GARDENS
('000 1973 TAKAS)

Item	Value
1. Main Factory Building	321.4
2. Machinery, Equipment, Vehicles	1385.6
3. Box Making House	7.7
4. New Box Making Godown	53.0
5. Foodstuffs Godown	229.2
6. Office	22.7
7. Oil, Petrol Godown	12.5
8. Lorry Garage	36.0
9. Carpenter, Blacksmith's Workshop	26.3
10. Fuel Oil Storage Tank	8.6
11. Labour Lines	290.0
12. Pump House	26.8
13. Manager's Bungalow	15.0
14. Asstt. Manager's Bungalow	85.3
15. Manure Godown	12.0
16. Cement/Timber Godown	70.0
17. 2 Leaf Houses	180.0
18. Total	2917.1

Source : Garden accounts.

Apart from item 2, the remainder, about 52.5% of total fixed investment, is in construction. Since ARs for construction, machinery and transport equipment were available in [22] a preliminary estimate of shadow worth of fixed assets has been made. It was not possible to disaggregate item 2 into machinery and equipment, and transport equipment (trucks, tractor, jeeps). Item 2 was entirely converted at the machinery AR of .572. Since the AR for transport equipment was only a trifle bigger, .579, the difference is small anyway. Items 10 and 17 have been evaluated at the AR of .577, the AR for metal products, because these structures are based on metal products and not building materials as such. The construction AR of .464 was applied to the remaining items. The result was an estimate of Tk. 1524.3 thousand. Shadow depreciation was obtained by applying to above estimate the ratio of depreciation to value of fixed asset, both in market prices.

Financial Charges at Shadow Prices

Although Commercial bank lending rate stood at 9% the capital market facing the tea industry in general, and sterling gardens in particular, must be considered different from the rest of the industrial sector. Tea production is a highly risky enterprise, subject to weather, pests, parasites [34;38]. The demand for credit is usually for working capital, borrowed for one year under crop hypothecation scheme. But since perceived creditworthiness is a function of gross sales, which is a function of crop raised (which fluctuate relatively to other industries) the credit supply curve facing the industry is more inelastic than for other industries. Especially now that banks are nationalised and the public sector is an important rival of sterling gardens as a tea producer, not to speak of discriminatory policies of the Government towards the latter vis-a-vis local tea producers [17], there is a strong presumption that effective rate of interest facing the selected garden has been about 12%. Since our ARI is higher, appropriate adjustments to market interest charges were made to arrive at shadow financial charges. Transport and trade inputs were converted at appropriate ARs from [22], while for managing agency commission, we have used AR for miscellaneous services.

Shadow Pricing of Output

The garden's disposal of 1973 teas among three principal means of sales is shown in the table below. One difficulty was that a classification of Chittagong disposal according to internal buyer and barter operators is not available, although there is evidence that barter purchases are dominating Chittagong auctions, owing to hectic buying by Russia and especially Poland [6], and that internal purchases are a small and falling proportion of total sales. The second difficulty was identification of freely convertible earnings implied by sales under barter-deal and through private treaty. We assumed that the entire Chittagong disposal of our garden was lifted by barter-operators. This assumption was made for simplicity, so that we could arrive at the foreign exchange equivalent of teas sold under barter-deals (see below). The proportion of our garden's tea lifted by internal bidders must have been very small anyway. As for the second, we were unusually helped by a private and confidential table⁹ which read "Conversion table equating price per kg. (£) with approximate Chittagong auction equivalent prices per lb. against various types of export". In explanatory notes on the table, the document states that "the Chittagong auction equivalent of

⁹Prepared by the company owning the selected garden and 11 other large gardens in Bangladesh.

TABLE VI
DISPOSAL OF TEA (TAKA)

Chittagong Sales		Overseas	
Leaf	Dust	Direct	London
204930	454270	812244	884619
(8.7)	(19.2)	(34.5)	(37.5)

Note : Parentheses are percentages of the total.

Source : Final Leveller, season 1973.

a given export price is the approximate price the teas in question would have to fetch at Chittagong auction to yield the same return in takas as selling in London would yield, all extra costs implied by exporting being allowed for". The table enables one to convert proceeds from any transaction into London auction terms which are in border takas. The table is our basis for deriving the shadow value of the output.

Finally, our rates of return are perpetuities, on the assumption that depreciation allowances keep assets intact. Net benefits, both in shadow and market prices, are assumed to be constant at 1973 prices.

Results

We present our results through a sensitivity analysis as there is a *prima facie* case for thinking the values of SWR and SCF important to the result and no certainty about the precision of the estimate for SCF or the value judgements embodied in the SWR.

TABLE VII
SOCIAL RATES OF RETURN FOR VARIOUS SCF AND SWR

SWR	SCF		
	0.75	0.62	0.50
0.607	16.4	17.5	18.4
0.562	20.2	21.3	22.2
0.510	24.6	25.6	26.6
0.360	37.2	38.2	39.1

Rate of returns at market prices = 7.25.

The first implication of the table is that, under all assumptions, market prices seriously understate social profitability, the rates of return approaching the ARI as SWR rises to what we think is the most likely range for it: 0.51 to 0.607.¹⁰ The second implication is that social profitability is more sensitive to the SWR than the SCF—changes down the rows are greater than those across columns. It is important to remember that the rates are possibly under-estimates. Note also that the lower limit of the range of our estimated social rates is 16.4% and this compares with the 15.9% estimated by Khan for the industry as of mid-60s. However, Khan's aggregative data were from Census of Manufacturing industry (CMI) and ours were micro data collected first-hand. Given different data sources and therefore variations in methods of estimation underlying them, the fact that both exercises have largely similar results strongly suggests that the basic social profitability of the Industry has remained broadly unchanged since the mid-60s.

V. CONCLUSION

The main conclusion of the study is that, despite negative private returns, the garden has high social profitability. The important implication is that, unless the government appropriately adjusted the fiscal system, resources would begin to pull out of the industry with undesirable balance of payments effects. The finding is a specific illustration of the proposition that more resources should be channeled into producing exportables than is apparent from using market prices in countries currently having protectionist policies. Should Bangladesh expand tea production then? Although she is a marginal producer, this question turns on possible supply responses of her competitors. Since for quite some time now, the price elasticity of demand facing the tea producers as a whole has been believed to be quite low (with probably negative marginal revenues), it would be self-defeating to have increases in supply from other producers, especially the ones with relatively lower estate costs, at the same time that Bangladesh raises production. In the absence of any hard evidence on this count, it is difficult to estimate own marginal revenue for Bangladesh over the relevant range. Casual use of world prices, without knowledge of behaviour of alternative supply sources,

¹⁰The Planning Commission of Bangladesh has arrived at a SWR estimate of 0.50 for unskilled workers [29]. For India, an initial estimate of SWR is 0.56 [30].

may yield highly lucrative own marginal revenue estimates to individual countries producing the same good and cause them to compete damagingly against each other. While answering the above question in a satisfactory manner calls for a full-dress research, the conclusion can be made from this study that the sooner the Bangladesh government eliminated the spread between private and social rates of return, the better for the industry and the economy.

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The Seed-Fertilizer Technology and Surplus Labour in Bangladesh Agriculture

by

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I. INTRODUCTION

In recent years the introduction of high-yielding variety (HYV) seeds and fertilizer has been accepted as a major policy measure in the agriculture of most of the developing countries for the primary objective of attaining self-sufficiency in foodgrains. In addition, it has been found that these new varieties of seeds have quite a tangible effect on the rural labour market. There have been several studies on the various implications brought about by the introduction of the HYV seeds, particularly on the long-run deleterious effects on distribution of income. Relatively however, evidence on the impact of the HYV technology on the labour market is less and inconclusive [7; 15; 17; 28; 32]. Some of the literature on this aspect have been examined in Section II to bring out a proper perspective of the technology in the context of economies like Bangladesh. Section III discusses briefly the cropping pattern and adoption of new seeds in Bangladesh. Impact of the modern farming technology on labour requirements in Bangladesh is discussed in Section IV. Finally, once we have gathered a farm-level demonstration of labour-use in the traditional and HYV crops, we take a critical look in Section V at the Government's Plan proposal [4; pp. 17-20] for removing surplus labour and creating new employment opportunity in the agricultural sector through the seed-fertilizer technology, and consequent changes in cropping patterns. The study concludes with a brief summary of the main results and an appendix.

II. EMPLOYMENT-INCOME IMPLICATIONS OF THE SEED-FERTILIZER TECHNOLOGY

Developing countries such as Bangladesh, which are largely agricultural should try to promote economic development by way of rural regeneration side by side with expansion in the industrial and services sectors. Besides, increased agricultural productivity is essential in order that the surplus can be released to sustain the modern sector, to avoid the need for high levels of primary imports. Considering the fact that the agricultural sector is frequently land-scarce and

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labour-abundant, there have recently been suggestions for the adoption of land-augmenting and labour-using innovation in this sector. The high-yielding varieties (HYV) of seeds, chemical fertilizers and other inputs which permit an optimum yield response—all involved in what is popularly referred to as the “green revolution”—are examples of this type of innovation.

Indeed, the development of the new agricultural inputs has already had a profound effect on the yields of rice and wheat in various parts of the world. It has brought about a 30 % increase in wheat production and 18 % increase in rice production in Asia during the period 1960 to 1969 [10, pp. 151-99]. Some of the LDCs which were food-deficit countries turned self-sufficient (e.g., Mexico) so much so that they could now export some of their small surpluses.

Self-sufficiency in food production, however, does not say anything about income distribution and employment questions which must also command attention. From the point of view of employment, the following advantages are sometimes alleged in favour of the adoption of HYV :

- (i) more labour-intake in the form of intensive weeding, harvesting and ploughing, more labour-intake also due to the scope for multiple cropping (one of the agronomic features of HYV being its quick maturation period).
- (ii) HYV could be introduced to both the small and large land-holdings with equal effectiveness so that labour could be further absorbed in all sizes of farm-holdings. Such a belief, however, has met with strong opposition.
- (iii) HYV technology was expected to generate higher money incomes (through higher production) and higher consumption; this would lead to further employment in other sectors.

Below are some data from selected provinces of Philippines, contrasting the labour requirements in HYV and the local varieties of rice.

TABLE I
LABOUR REQUIREMENTS IN HYV AND LOCAL VARIETIES OF RICE:
PHILIPPINES

Crop	Labour Input (mandays/hectare)	Labour Input (mandays/ton)
1967 Wet Season		
IR-8	79	16.5
Local	51	20.4
1968 Wet Season		
IR-8	69	18.7
Malagkit Local	58	20.6

Source : [27].

With the introduction of HYV, while it is possible that there may be little impact on labour requirements in operations such as seeding and transplanting, the harvesting and thrashing of a greater yield would require a greater labour input per acre. Besides, owing to intensive application of fertilizers, it is likely that weeding has to be more frequent and intensive. This too increases the demand for labour. Mangahas, *et al.* confirm this observation in their survey of Central Luzon and Laguna provinces of Philippines [21, p. 13].

A large section of the literature on HYV thus tends to demonstrate that the new agricultural inputs (seeds, fertilizers, irrigation etc.) are by themselves land-augmenting, and often labour-using. [13; 32, pp. 70-78]. Labour income might therefore rise in the short run, either through rising wage rates or increased employment. But this might not in any measure correct the imbalance in income distribution favouring the large land-owners who could stand to gain most from the increased land productivity.

Although the greater intensity of farming made possible by the HYV should have a considerable effect in increasing labour requirements per acre, it must be remembered at the same time that the efficiency of complementary inputs, particularly land, fertilizer and water, is improved by the use of these new seeds. As a consequence, the required labour input per unit of output is likely to decline. This is evident from Table I where, with HYV, labour input increases per hectare, but declines per ton compared with input requirement of the local varieties.

III. CROPPING PATTERN AND THE ADOPTION OF THE NEW SEEDS

The major agricultural crop in Bangladesh is rice which accounts for 70% of the agricultural value-added [8]. There are three varieties viz., *aus*, *aman* and *boro*, which are generally grown in three different seasons. In terms of acreage and total yield *aman* is the most important crop accounting for 45.9% of the land cultivated. Land under *aus* and *boro* is 25.5% and 7.5% respectively.

The adoption of high-yielding varieties (HYV) of rice occurred comparatively late in Bangladesh. HYV was first introduced in 1965 on a purely experimental basis at the Bangladesh Academy for Rural Development, which after varietal tests, recommended some of the varieties to be grown over different seasons. The HYV more or less corresponded with the growing period of the local varieties; hence an adoption of, say, *boro*-HYV would have necessarily meant forgoing land under *boro*-local.

The response to HYV cultivation and the performance in terms of acreage, production and yield-per-acre (from 1968/69 to 1972/73) as compared with local varieties are shown in the following table.

TABLE II

**COMPARATIVE PERFORMANCE OF LOCAL AND HYV RICE IN
BANGLADESH, 1968/69 TO 1972/73**

Year	Acreage (lakh acres)			Production (lakh tons)			Yield/Acre (mds.)	
	Local	HYV	Proportion of HYV to Local (per cent)	Local	HYV	Proportion of HYV to Local (per cent)	Local	HYV
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1968/69	236.92	3.89	1.64	106.14	5.51	5.19	13.43	37.13
1969/70	248.35	6.52	2.62	108.63	9.53	8.77	13.27	36.97
1970/71	233.58	11.37	4.87	94.62	15.06	15.91	12.60	34.23
1971/72	214.33	15.42	7.19	79.83	17.92	22.45	11.60	30.80
1972/73	211.65	26.32	12.43	74.44	24.86	33.40	10.87	26.83

Source : [3].

As can be seen from the table the percentage of land under HYV as a proportion of the local variety was only 12.43% even as late as in 1972/73 while the similar ratio for production was 33.40%. The impediments to large-scale adoption of the new varieties in Bangladesh may be traced to:

- (i) inadequate supply of material inputs, viz., fertilizer, pesticides and particularly irrigation water ;
- (ii) inadequate supply of credit to farmers;
- (iii) the relative price-ratio between the HYV and the local variety. The price of the local variety has always been found to be higher than that of the HYV, principally because of consumer taste patterns. This is however, not a big disincentive to producers of HYV in a country where there are large food-deficits every year ;
- (iv) relatively higher cost per acre in terms of input-use (particularly labour use) in the cultivation of HYV. This is also not fully tenable since the yield per acre of HYV would more than compensate the costs. For instance, let us consider the following table showing per acre cost of production of the two varieties in Bangladesh.

TABLE III

PER ACRE COST OF PRODUCTION OF HYV AND BEST LOCAL VARIETY

	(Rupees/acre)		
	HYV (1)	Local (2)	Ratio of (1) to (2)
Gross Cost	644.49	446.39	1.44
Subsidy	327.98	244.09	1.34
Cost to Farmer	316.51	202.30	1.65

Source : [19].

We find from Table III that the average yields per acre for the local and HYV are 12.35 maunds and 33.19 maunds respectively, giving a ratio of 2.68 in favour of the latter. Even if we discount by a rough price-relative (say 75%) the ratio would still be 2.10 in favour of HYV, compared to the cost ratio of 1.65 against it.

IV. THE NEW SEEDS AND LABOUR DEMAND

The Data

Our analysis in this section is based on a survey of about 152 farms in the district of Mymensingh, Bangladesh. The survey was conducted by the Bangladesh Institute of Development Studies in 1969/70. A primary difficulty in using the data from the survey for our analysis was that it was basically designed for different purposes, viz., researches on farm income, productivity, marketed surplus, tenurial conditions etc. As such a lot of information, relevant for our study, was either lacking or fragmentary in character. From whatever information was available, some piece-meal, but pertinent, results are presented below.

Owing, once again, to the non-availability of required data, our study has been mostly confined to information on 105 farms out of which 47 farms participated in HYV cultivation. Of the participant farms, only one had more than 10 acres of land. Despite the small number, a category of farms holding more than 10 acres was made in order to stress the absence of large-acreage farming in the country. The proportion of very small farms (under 2.5 acres) is also slightly lower than for the country as a whole.

Adoption Behaviour

From our finding on the adoption behaviour in the participant farms (Table IV), we observe that it is the medium farmers (2.5 to 6.0 acres) who have

been most responsive to the cultivation of the new seeds. The small farmers too, were more responsive than the large farmers, not only in terms of the percentage of farms but also according to the total land devoted to HYV cultivation. This feature contradicts the usual findings in India [28,p.11], that it is the larger farmers who manifest the widest adoption. This is because the large farmers in Bangladesh are not really very "large"; hence, the attraction of introducing mechanization (at high costs) to improve land productivity is only limited. On the other hand, farms of less than 2.5 acres of land are less responsive than the medium farmers perhaps because of the risk-minimization attitude of the small farmers in the face of obstacles and uncertainties involved in the availability of credit for increased input-purchase. The average percentage of land devoted to HYV cultivation by farms in all the size-holdings is about 26% which is quite high

TABLE IV
ADOPTION BEHAVIOUR IN PARTICIPANT FARMS

Farm Size (acres)	No. of Farms Participating in HYV	Percentage to Total Farms Adopting HYV	Percentage of Farms Adopting HYV within Respective Size-holdings	Total Cultivated Land by the Participant Farms	Acreage Sown to HYV	Percentage of HYV Land to Total Land Cultivated (6)-(5)x 100
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0-2.50	13	27.7	24.5	23.79	6.76	28.4
2.50-4.00	14	29.8	32.6	42.56	12.36	29.1
4.00-6.00	14	29.8	45.2	66.93	19.14	28.6
6.00-10.00	5	10.6	29.4	33.24	8.20	24.6
Over 10.00	1	2.1	16.7	13.40	0.57	4.3
Total	47	100.0		179.92	47.03	26.1

compared to the Bangladesh average of 12.4% (Table II). It may be mentioned here that the district of Mymensingh, to which our farms belong, has relatively better irrigation facilities than most other parts of the country.

Use of Labour-input

Table V shows the total labour requirements for the cultivation of local and improved varieties of rice at various stages of cultivation. (The three stages of cultivation considered are land preparation, sowing & weeding, and harvesting and thrashing.)

TABLE V

LABOUR REQUIREMENTS IN LOCAL AND IMPROVED CROPS
(152 FARMS IN MYMENSINGH)

(mandays/acre)

Operations	Aus/ Aman* (local) (1)	Boro (ILV) (2)	Boro (HYV) (3)	Proportion of (3) to (2) (per cent) (4)	Proportion of (3) to (1) (per cent) (5)
Land Preparation	12.29	17.19	20.54	19.5	67.1
Sowing/Seeding	11.62	19.24	28.31	47.1	143.6
Harvesting/Thrashing	11.52	17.00	20.12	18.4	74.7
Total	35.43	53.43	68.97	29.1	94.7

* Weighted average.

While *aus* and *aman* are categorised as local (there has been insignificant practice of HYV during these two rice seasons), *boro* is divided into the traditional and HYV categories. Traditional *boro*, henceforth referred to as improved-local-variety (ILV), has been found to have greater yield potential than any of the other local varieties, and is a widely adopted winter crop, which has to depend relatively less on irrigation (and that too traditional) compared to the needs of *boro*-HYV. Our findings show that the total labour required for cultivation of local (i.e., *aman* and *aus*), *boro*-ILV and *boro*-HYV are 35.43, 53.43 and 68.97 man-days per acre respectively. That is to say there is an increased labour demand of about 95% for HYV over the local variety, and 30% over the improved local variety. It is further noticed, from the same table, that HYV requires more labour-input at all stages of cultivation, particularly during the period of weeding. It is here that we find the significance of casual labour which is used only seasonally and according to the farm's need. We have thus broken up the table on total labour requirements in Table VI, which is designed to bring out clearly the nature of labour absorbed (whether permanent or casual) at each stage of cultivation. Permanent labour in Bangladesh nearly corresponds to family labour. While we observe that for sowing and weeding, HYV absorbs 29.5% more of permanent labour than the local variety's requirements, its demand for casual labour increases by about 243%. *Boro*-ILV also uses more casual labour than the other local varieties. Because of its yield potential, the Current Plan lays the greatest emphasis on increasing the acreage of *boro*-HYV, which as the past trend shows (Table VII) has been competing away land from the traditional *boro*-ILV.

TABLE VI

PERMANENT AND CASUAL LABOUR REQUIREMENTS IN PRODUCTION OF RICE (AT VARIOUS STAGES OF CULTIVATION) OF THE 47 PARTICIPANT FARMS

Operations	(mandays/acre)		
	Traditional Aus/Aman* (1)	Improved Local Variety (boro) (2)	HYV (IRRI-boro) (3)
Permanent Labour			
Land Preparation	11.77	14.24	18.43
Sowing/Weeding	5.42	5.04	7.02
Harvesting/Thrashing	5.00	7.73	10.02
	<u>23.09</u>	<u>27.01</u>	<u>35.47</u>
Casual Labour			
Land Preparation	0.52	2.95	2.11
Sowing/Weeding	6.20	12.40	21.29
Harvesting/Thrashing	5.62	9.27	10.10
	<u>12.34</u>	<u>26.42</u>	<u>33.50</u>

*Weighted average.

TABLE VII

COMPARATIVE TRENDS IN PRODUCTION OF AND ACREAGE UNDER BORO-ILV AND BORO-HYV IN BANGLADESH, 1968-73

Year (1)	Boro-ILV		Boro-HYV	
	Acreage (2)	Production (3)	Acreage (4)	Production (5)
1968/69	1655.7	1090.4	359.7	521.5
1969/70	1603.6	1043.9	579.5	859.0
1970/71	1568.4	1004.9	857.2	1187.3
1971/72	1389.9	771.9	795.4	966.2
1972/73	1346.1	730.6	1087.9	1339.6

Source : [3,p.26].

The data in Table VII confirm the Plan's great emphasis on *boro*-HYV for realising the aim of attaining self-sufficiency in food. What is more vital for our purpose, however, is to seek the employment effects of this seed-based technology. From our survey data, we find the following information (Table VIII and IX) on the differential patterns of yield, and use of labour and fertilizer inputs in the two varieties of *boro* over different size-holdings.

TABLE VIII
PARTICIPATION IN TRADITIONAL TRANSPLANT, BORO-ILV
(105 FARMS IN MYMENSINGH)

(average per acre)

Farm Size* (acres) (1)	No. of Farms (2)	Average * Farm Size (acres) (3)	Labour- use (mandays) (4)	Output (maunds) (5)	Fertilizer- use (seers)** (6)
0-2.50	35	1.72	55.62	24.98	58.21
2.50-4.00	33	3.35	55.98	23.92	71.84
4.00-6.00	24	5.03	45.21	23.64	76.63
6.00-10.00	10	7.14	42.91	23.61	67.15
Over10.00	3	12.42	54.66	20.92	91.08

* According to total cultivated land.

** 1 md.=40 seers; 1 ton=27.2 mds.

TABLE IX
PARTICIPATION IN HIGH-YIELDING VARIETY, BORO-HYV
(47 FARMS IN MYMENSINGH)

(average per acre)

Farm Size* (acres) (1)	No. of Farms (2)	Average Farm Size (acres) (3)	Labour- use (mandays) (4)	Output (maunds) (5)	Fertilizer- use (seers) (6)
0-2.50	13	1.83	78.88	38.41	112.69
2.50-4.00	14	3.11	70.11	37.74	97.92
4.00-6.00	14	4.78	65.22	37.33	115.53
6.00-10.00	5	6.64	77.13	35.80	144.52
Over10.00	1	13.40	75.44	45.61	136.84

* According to the total cultivated land.

The above information leads to the following results. Firstly, we find that the per-acre yield of *boro*-HYV is more than 50% higher than that of *boro*-ILV over every farm-size, with the small and medium farms having the highest yield per-acre. (For *boro*-HYV, there is only one farm above 10 acres, and it would be greatly misleading to generalize its performance for all large farms.) Secondly, in the cultivation of *boro*-HYV, as compared to *boro*-ILV, there is an increased labour use of from about 25% for the farm-size of 2.50-4.00 acres up to 80% for the category of 6.00-10.00 acres. Thirdly, the use of fertilizer-input is much higher in *boro*-HYV than in the local variety. The percentage increase in yield and use of inputs per-acre, with the adoption of improved variety of seeds, over various farm sizes are given below (all figures are positive).

TABLE X
PERCENTAGE INCREASE IN YIELD AND USE OF INPUTS

Farm Size (acres) (1)	(HYV/ILV x 100)		
	Labour (2)	Fertilizer (3)	Output (4)
0-2.50	41.8	93.3	53.8
2.50-4.00	25.2	36.3	57.8
4.00-6.00	44.3	15.1	57.9
6.00-10.00	79.7	115.2	51.6
Over 10.00	38.0	50.2	118.0

We have further split the labour-requirements into family and hired labour, and their use in the two varieties at various stages in cultivation.

TABLE XI
USE OF FAMILY AND HIRED LABOUR IN LOCAL AND
HYV CULTIVATION

Operations	(mandays/acre)					
	Local Variety			HYV Variety		
	F.L.	H.L.	T.L.	F.L.	H.L.	T.L.
Land Preparation	12.48	7.98	20.46	15.59	12.02	27.61
Sowing/Weeding	6.79	12.28	19.07	8.13	23.48	31.61
Harvesting/Thrashing	8.20	9.32	17.52	9.70	11.73	21.43
Total	27.47	29.58	57.05	33.42	47.23	80.65

Note : F.L.=Family Labour; H.L.=Hired Labour; T.L.=Total Labour.

We find that for all operations both family labour and hired labour are in greater demand in the cultivation of HYV, though labour requirements of the latter type increase more than those of the former type. Total demand for labour has increased by about 40 %, a higher figure than that in our estimates of Table V. This is because in our earlier estimates we have not included the category of permanent hired labour (which is actually a small fraction of the total permanent labour, largely family labour).

From our analysis of the micro-level data on some farms in Bangladesh we can clearly see that there is an increase in labour demand together with the increase in yields from the improved seeds.¹ Far from being conflicting, the relationship between output and employment appears to be concomitant in a framework based on seed fertilizer technology. Further, compared to the demand for family and permanent labour, it is the hired labour whose rise in demand is the greatest. They are mostly casual and are required only seasonally. Our finding on labour absorption through adoption of improved varieties in the Mymensingh district compares favourably with a study on Comilla (another district of Bangladesh). The study has shown that for HYV (IRRI-8), labour requirement per acre on an average exceeded Shaitta's (local variety) labour requirement per acre by 92 %, and that for *boro*-ILV by 38 % [1, pp. 27-28]. The corresponding figures in our study are 95 % and 40 % respectively.

V. THE SEED-FERTILIZER TECHNOLOGY AND SURPLUS LABOUR IN BANGLADESH AGRICULTURE

The Bangladesh Plan and the New Technology

The First Five Year Plan of the Government of Bangladesh [4, pp. 17-20 and 92-112], places foremost emphasis on an increase in yield of foodgrains, and on job opportunities in the agricultural sector. In order to realise the twin goals, the Plan relies greatly on the extensive and intensive cultivation of the new seed varieties of rice. It is expected that the acreage under improved varieties of *aus*, *aman* and *boro* should increase by a total of 220 %, 547 % and 206 % respectively over the Plan period [4, p. 93]. We must recall that the base-acreage of HYV in the past has been rather low. While increased yield and employment may not provide any serious conflict in the context of Bangladesh agriculture (as noted in our farm-level study earlier), at least in the short-run, the issue of raising output through the targeted increase in HYV acreage is open to serious

¹A formal statistical method to establish a significant variation in labour use between the local and improved seeds is presented in the Appendix.

doubt, particularly in view of the limited capacity to spread irrigation over the regions so quickly and also the inadequacy in the supply of other material inputs.

Regarding increased job opportunities, the Plan pledges "to provide productive employment to the growing rural labour force, for whom prospects of non-agricultural employment will remain small for many years to come. Labour-intensive methods of production as applied to the new high-yielding cereal varieties can greatly contribute to this end" [4, p. 87]. With this objective in view, the Plan places responsibility on the agricultural sector to create an additional labour demand of 2.6 million man-years over the Plan period. But once we note the doubtful prospects of the expected growth of HYV-acreage, the possibilities of attaining such an ambitious employment target in this sector are also limited. The labour force in Bangladesh is expected to increase by about 0.8 million every year. Given as a generous estimate, that the non-agricultural sector were to absorb 0.3 million of the annual additional labour force, the agricultural sector would have to create employment for about 2.5 million over the five year period. While the Plan wishes to be able to provide for 2.6 million rural workers, it modestly admits that 50 per cent of the labour demand would go to reduce under-employment created by work-sharing in agriculture. Thus, in effect, only 1.3 million new jobs would be created in this sector, much less than the growth in the rural labour force. More important for us, however, is to analyse the Plan's acceptance of removing the surplus labour that exists in the form of work-sharing. This raises two issues for us. First, we would have to estimate a rough magnitude of surplus labour as existing before the Plan implementation. Second, we would have to work out an index of labour intensity over the Plan period that is expected to increase owing to shifts in cropping patterns and practices in favour of the HYV. From this we could relate the Plan's targets with what it would actually be possible to realize, and hence to find out whether in fact the surplus labour would be removed over the period of the Plan.

According to the Census definition of 1961 the unemployed labour force (expressed in terms of persons who are not working at all but are looking for work) in Bangladesh was found to be as small as 0.49 per cent of the total labour force. The C.S.O. Population and Labour Force Survey showed rural unemployment at less than 1 per cent of the labour force in 1965. Such figures conceal a considerable measure of under-employment. In the agricultural sector, the workers do not consider themselves as unemployed if their families have land and they are supported by the general activity of the household. According to the Quarterly National Sample Survey, the proportion of such self-employed and unpaid family workers in Bangladesh amounted to about 70 per cent of the total labour force in 1967/68. Hence, high under-employment is consistent with low returns of rural unemployment in Bangladesh.

Surplus Labour in Bangladesh Agriculture : Procedure and Estimation

There have been several attempts to measure the surplus labour in an economy theoretically and empirically [18], but the results have been rather confusing and often contradictory. As for instance, in the case of empirical finding on India, Mathur concluded that in "West Bengal, which is one of the most thickly populated states of India, disguised unemployment comes out to be almost one-third (33.1 per cent) of the rural working force" [22]. On the other hand, Paglin, analysing the data of the Indian Farm Management Institute, contended that the marginal product of labour in Indian agriculture was positive and that there was no substantial amount of surplus labour [24]. Though the differences, in some cases, may be real, the fundamental reason for such differences may, however, be in the concepts and procedures used by the estimators. One widely popular approach is to apply the Cobb-Douglas production function, and to determine surplus labour on the basis of whether or not the marginal product of labour is zero or positive. In an attempt to measure surplus labour in paddy cultivation in Bangladesh, such a method was used (with land, labour and non-labour costs as the explanatory variables), which showed that surplus labour amounted to 40 per cent of the existing workforce.² We are, however, cautioned that a work equilibrium at zero marginal product of labour is not necessary (nor, incidentally, is it sufficient) for the thesis of disguised unemployment [27, p.33]. Moreover, to adopt Cobb-Douglas functions in specifying agricultural production may be misleading insofar as some crucial input relations are complementary or supplementary in nature. [14, p. 217].

In the absence of any unique measure of surplus labour, an alternative approach is to infer from directly observable relationships of, say, labour and crop output or labour and cropped land, etc. If one takes land to be the factor with which to relate, the procedure would be to compute the labour force 'required' per unit of land. Then the total labour force 'required' can be calculated from a knowledge of the amount of cultivated land. The surplus labour can thus be derived by comparing the required and the actual labour force. Mehra, in her study on surplus labour in six Indian states, uses a 'norm' similar to the above [23]. She assumes the phenomenon of underemployment to be true of only family labour, and further assumes that the largest land-holding would have the maximum number of hired workers. She then calculates a labour-intensity index (with eight hours as a standard work-day) for the various size-holdings, taking labour intensity for the largest size-group as unity. Once the 'required' labour in each size-holding is derived, the surplus can be found after deducting from the actually employed. Her results show a puzzling variation in surplus labour, ranging from 57% in Assam

²Surplus Labour in Paddy Cultivation in East Pakistan, 1964/65, Ministry of Agriculture, East Pakistan (now Bangladesh).

to 12% in Maharashtra. In order to overcome some of the problems that may arise from complete disaggregation (unless thoroughly observed), we, for our estimation of surplus labour, intend to proceed at a further level of aggregation, viz., to use average labour (in man-hours) per cropped acre over all size-holdings.

Our estimates of surplus labour in the agriculture of Bangladesh are based on the methodology used by Tims [31]. On the basis of farm-management studies, Tims calculated the average man-hours per cropped acre in Bangladesh in 1960/61 as 600, and a full year's equivalent of employment as 2200 hours. In addition, the labour force employed in livestock and fisheries was taken at one-third of the man-years employed on crops. In a later study, Stern [29] adjusted the average man-hours/cropped acre in 1960/61 to 650. Using Stern's proportion between man-days per acre and man-hours/cropped acre (hence avoiding the problem of estimating labour intensity in terms of hours worked per day), we find, from the study on our farms, that the average man-hours/cropped acre comes to near 650 for 1969/70. This would imply that over 1960/61 to 1969/70 there have been few changes in the cropping practices such as would tangibly raise labour demand per cropped acre. The adoption of the new seeds was also not very extensive.

Further, in order to be able to project unemployment and underemployment over the Plan period of 1973/74 to 1977/78, we would require to project the changes in the labour demand due to changes in cropping pattern, since the spread of the new seed-based technology, as the Plan proposes to do, would raise labour requirements. This we have done in Table XII. The acreage figures for different crops have been taken from the Plan projection, while the labour/acre have been taken from our farm-study (refer to Table V).³ The labour/acre figures for *aus* and *aman* from that table have been slightly adjusted upward to include a small increase in labour demand due to some extent of HYV varieties during the rice season. The acreage figures of sugarcane for 1973/74 and 1977/78, and that of tobacco for 1977/78 are not given in the Plan, and had to be extrapolated on the basis of past trend figures [4, p. 85].

Once we have derived the index of labour intensity we can apply this to 1969/70 (our base year) figure on average hours/cropped acre, and arrive at our projections of unemployment in Bangladesh agriculture, shown in Table XIII.

³We have weighted HYV and local acreages by respective labour requirements obtained from our farm-data; hence labour and acre remains the same over the Plan. Only acreage changes, and that too, according to Plan projection of changes in cropping patterns and practices.

TABLE XII

LABOUR INPUTS IN MAJOR CROPS IN BANGLADESH

Crop	1969/70			1973/74			1977/78		
	Acreage (mill. acres)	1969/70 Mandays (per acre)	Million Ma n- days	Acreage (mill. acres)	1973/74 Mandays (per acre)	Million man- days	Acreage (mill. acres)	1977/78 Mandays (per acre)	Million Man- days
Aus—Local	8.46	40	338	7.56	40	302	5.12	40	205
Aus—HYV				0.33	69	23	1.54	69	106
Aman—Local	12.84	40	594	7.50	40	300	6.50	40	260
Aman—HYV				2.50	69	173	4.85	69	335
Boro—Local	2.18	54	118	0.80	54	43	0.50	54	27
Boro—HYV				2.00	69	138	3.63	69	228
Jute	2.46	98	241	2.10	98	206	2.20	98	216
Sugarcane	0.41	46	19	0.55	46	25	0.73	46	34
Tobacco	0.11	90	10	0.21	90	19	0.23	90	21
Total	28.46		1320	23.34		1229	25.30		1432
Mandays/Acre			46.38			52.66			56.60
Index of Labour Intensity			100			114			122

Sources : For 1969/70 acreage, [8]; for 1973/74 acreage, [4, p.93]; and Land Utilisation figures, [3]. For Mandays, see Section IV.
For figures on jute, [29].

TABLE XIII
EMPLOYMENT AND UNEMPLOYMENT IN BANGLADESH
AGRICULTURE

	1969/70	Plan Period	
		1973/74	1977/78
1. Average Hours/Man-year	2200	2200	2200
2. Cropped Acreage	31.76	30.01	32.32
3. Average Hours/Cropped acreage	650	741	793
4. Employment on Crops (million mandays) $\frac{(2) \times (3)}{1}$	9.38	10.15	11.65
5. Livestock, Fisheries etc. ($\frac{1}{3}$ of (4)),	3.09	3.33	3.84
6. Total Agric. Employment	12.47	13.48	15.49
7. Total Agric. Labour Force	20.71	20.97	23.61
8. Unemployment	8.24	7.49	8.12
9. Per cent Unemployed	39.8%	35.7%	34.4%

Sources : 1969/70 Cropped acreage—[8].

1973/74 and 1977/78 cropped acreage—[4], and an assumed 1.5% increase in cropped acreage. 1969/70 Agric. labour force—[2].

1973-78 Agric. labour force—extrapolated at 3% rate of population growth; 35% labour force participation; and 81% agriculture's share in labour force; see [2].

We find that while unemployment in percentage terms is decreasing, absolute unemployment would tend to increase over the Plan period. The percentage of unemployed would decrease from 39.8% in 1969/70 to about 34% in 1977/78, given the rate of adoption of the seed-fertilizer technology as envisaged in the Plan.

The Seasonality Argument

A seasonally surplus labour force is common in the agricultural sector of Bangladesh. Individual workers work 'full time' for only a few months of the year, or perhaps when the work-load is spread over the year, the workers, in the slack season, work only a fraction of the work-units which they work during a busy season. This type of unemployment, though real and widespread in Bangladesh, is perhaps "not removable" in Rosenstein-Rodan's phraseology [26]. The labour cannot, in other words, be moved out of agriculture without affecting production unless there is any agricultural re-organization. In view of the traditional pattern

in which the rural economy of Bangladesh is organized, our figures above on unemployment in agriculture may seem to suffer from some seasonality bias. In other words, it is very difficult to imagine a removal of about 35% of the work force out of agriculture without agricultural production falling drastically. Hence in order for a measure to be useful, it must be able to decompose the seasonal component of unemployment and measure the labour force which is "truly surplus" even when labour requirements are at seasonal peaks.

It is difficult to carry out such an exercise unless a direct survey is conducted on the availability of labour and its use over different seasons, if not exact periods in a month. In the absence of detailed information on this subject, we shall attempt to measure the "truly surplus" in a crude manner. For this we rely on the farm-level data from a survey conducted by the Bangladesh Institute of Development Studies in 1969/70 over 200 farms in the Dinajpur district of Bangladesh (information, however, has been retained of 147 farms only). From the data on observed labour-input requirement we can calculate the total labour used (in man-days) in the three stages of cultivation of various crops grown in the farms. The crops taken into consideration are transplanted-*aman*, *aus*, *aus*—HYV, *boro* (both local and HYV), jute and other winter crops. The crop-calendar below shows roughly the time of the three stages of cultivation corresponding to land-preparation, sowing and weeding, and harvesting and thrashing.

TABLE XIV
CROP-CALENDAR OF MAJOR CROPS IN BANGLADESH

Crop	Stage I	Stage II	Stage III
Aman (transplanted)	April-May	July-August	November- December
Aus	February-March	March-April	June
Aus-HYV	February-March	March-April	June
Boro	November-December	January-February	April
Jute	March-April	April-May	July-August
Other Winter Crops— (e.g., tobacco, pulses, oil seeds etc.)	November-December	January-February	March

It must be stressed that the crop-calendar is an approximation, and the individual farmers in various parts of the country may slightly diverge from a strict adherence to it.

Using the crop-calendar and the man-days of work done for different operations of any crop, we estimate the man-days of work done month-wise. For example, land-preparation (Stage I) of *aman* absorbs 'X' man-days spread over two months, April-May, so that in each month, labour utilised is estimated to be 'X'/2 man-days. The crucial assumption is that work is divided uniformly over these two months. We do this exercise for all crops for which information is available. Assuming that a fully employed labourer would be fully employed for 24 days a month, we convert the man-days in each month into 'fully' employed number of workers. Covering this exercise for all crops, and by adding, we get the month-wise distribution of 'fully' employed work-force.

TABLE XV
MONTH-WISE DISTRIBUTION OF FULLY EMPLOYED WORKERS
(147 FARMS IN DINAJPUR)

Months Crop	J	F	M	A	M	J	J	A	S	O	N	D
Aman				66	66		119	119			70	70
Aus		62	62	26		52						
			26									
Aus-HYV		13	13	7		14						
			7									
Boro												
(HYV&ILV) 8	8			9							6	6
Jute			25	25	18		20	20				
				18								
Other												
Winter Crops	6	6	33								23	23
Total	14	89	166	151	84	66	139	139			99	99

Year's total=1046

Estimating the so-called 'transferable' disguisedly unemployed labour in this way (by taking the population unemployed in peak season) may still have an upward bias, since we are assuming that for any operation, work is evenly distributed over the entire period—whereas, in practice, work may be unevenly distributed even within this period. This is, however, a more appropriate way of estimating surplus labour (for purposes of looking at the 'transferability' of agricultural labour) than the previous estimate from annual average of total demand and supply of labour.

Figure 1 presents a more clear picture of the seasonal demand for labour in our farms, (the frequency distribution referring to a histogram since, as earlier assumed, the observations occur throughout the 'cell' and not just at a point).

If we assume that the surplus labour proportion (on the basis of annual supply and demand) is 39.8, which is the estimated level for 1969/70 (Table XIII), we can estimate the 'transferable' surplus proportion for the 'busy season'. Again we assume the proportion of employment in livestock/fisheries to be of employment in crops, and is evenly distributed over the year. Then we have the following:

TABLE XVI
AN ESTIMATION OF THE 'TRANSFERABLE' SURPLUS

1. Total Supply of Labour in Man-months	:	(crops) (livestock) $\frac{1046 + 346}{60.2} \times 100$ =2313
2. Total No. of Labourers	:	2313/12 =193
3. No. of Labourers Required in Peak Season	:	166 + 29 (crops) (livestock) =195
4. 'Transferable' Surplus	:	-1%

Thus, while our average annual stock figures suggest a very high proportion of unemployment in agriculture of the country as a whole, the proportion of real 'transferable' surplus would be far smaller (often negligible or negative), at last by the 'peak season' criterion. The labourers, by definition, would not be in surplus if in one busy season they worked a 'maximum' [30, p. 3]. The peak season shortage in labour-supply in our farms may have been met by workers hired from outside, transfer of some persons engaged in non-farm activities, and/or extended work-days.

Paradoxically however, while we cannot, in the above sense, transfer labour from agriculture without a reorganization of the sector, we would find a very large percentage of surplus labour if we had aggregated the underemployed man-months, spread over the year (see Figure 1). Hypothetically, if we had taken the

SEASONAL DEMAND FOR LABOUR CROPWISE

DINAJPUR 1969/70

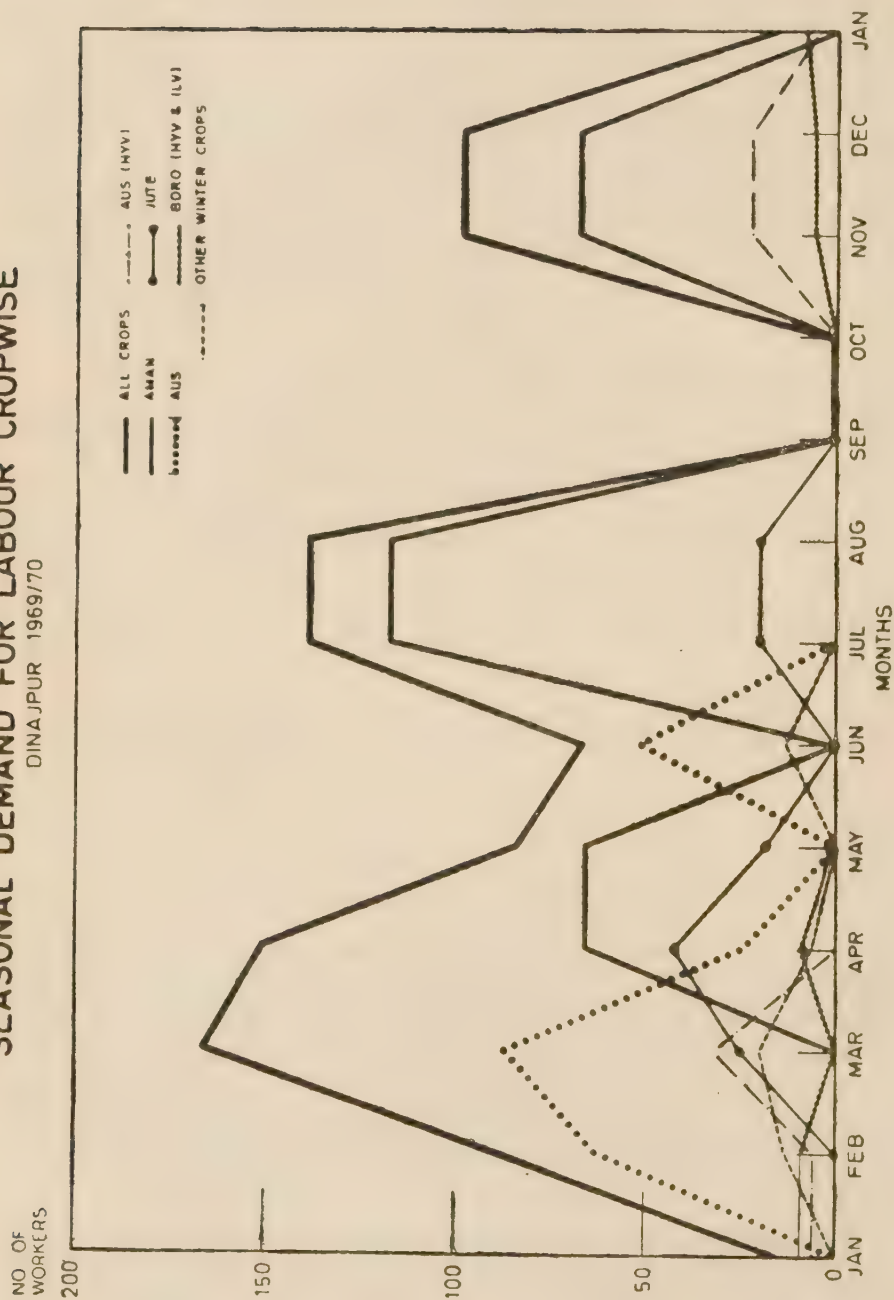


Figure 1

'peak season' labour Demand (D) to be equal to the Supply of labour (S) (assumed perfectly elastic over the year at a certain given wage rate) then we have,

$$S = 166 \times 12 = 1992 \text{ man-months,}$$

$$D = 1046 \text{ man-months,}$$

$$S - D = 946,$$

$$\frac{S-D}{S} = 47\% \text{ unemployed or under-employed man-months.}$$

Hence, we find that the pattern of the Bangladesh rural economy structure is such that while labour, *ceteris paribus*, cannot be shifted out of agriculture, surplus labour continues to exist. During the "troughs" they are engaged in some non-farm activities, viz., petty trading, construction work, boat-making, fishing etc.

Our estimation of unemployment and underemployment in this section is more in keeping with the planning perspective rather than a physical approach. The issue is confined to the fact that while the seed-fertilizer technology carries prospects for labour absorption in the context of Bangladesh agriculture (at least in the short run) a simple reliance on it (as done by the Bangladesh planners) would only go to show a misplaced concern, given the nature and extent of surplus labour. For instance, a faster growth of *aman* may intensify seasonality and call for an early mechanization which could be seriously damaging in the present context. The adoption of the new seeds in the *boro* season should be further encouraged to spread the seasonal labour demand. Other varieties, with shorter maturation period, may alter conventional harvesting periods. Hence, technological research which could to some extent take account of the "troughs" through changes in cropping practices, availability of credit, controlled irrigation and other material inputs which would perhaps make possible the attainment of acreage targets, are some of the essential forces to be accommodated within the strategy of the seed-fertilizer technology in Bangladesh.

VI. CONCLUSION

Technological changes in the agriculture of Bangladesh in the recent years have been limited to the adoption of the new seeds and chemical fertilizer, and that too, at a very modest rate. The seed-fertilizer technology has spread among all sizes of farm holdings, perhaps most among the small and the medium farms, which constitute about 70% of the total farms in the country. This is owing to the diversibility and somewhat scale-neutrality of the inputs involved so far. Our farm-study shows that the adoption of the new seeds, in the present situation, would

involve increased labour-use in all classes of farms. Ironically enough, a large-scale employment programme, based on this technology, (as envisaged in the Bangladesh Plan) may not serve the purpose of removing surplus labour in the agriculture sector, for reasons argued in the earlier section. Till the peculiarity of agricultural unemployment is understood within the proper economic and institutional milieu, the new technology in Bangladesh agriculture would remain an illusion to the planners while unemployment and underemployment continue to mount.

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Appendix

METHODOLOGY FOR COMPARING LABOUR REQUIREMENT BETWEEN TWO SETS OF FARMS

We have sample data on labour requirement of two sets of farms—one set growing the high-yielding variety of rice (*boro-HYV*), and the other growing the traditional variety (*boro-ILV*). Our purpose is to examine whether the labour requirements of these two groups of farms show a significant variation. The basic idea is to fit two regressions, for the two groups, between labour required (*L*) and some one or more explanatory variables—in our case, only fertilizer (*F*).^{1,2} But this procedure is conditional upon the assumption that the two regression lines (or plans) must be parallel. Hence, the first step is to compare the regression coefficients of the two groups. If we find that the coefficients associated with each of the independent variables are equal in both the regressions then we may go on to compare the regression intercepts. If the intercepts show significant variation, and the one for *HYV* is significantly higher than that for the local variety, we can conclude that the former employs a greater amount of labour.

Following the procedure, we combine the data from two classes together and run a single regression, that is, we regress *L* on the data matrix *F*. This yields estimates for the regression coefficients and a residual sum of squares (*S.S.*).

The equation we obtain is :

$$\begin{array}{llll} L=46.13 & + & 0.15F ; & R^2=0.21 \\ (20.27) & & (6.27) & S.S.=43,867.02 \end{array} \quad (1)$$

In the above and in all of the following equations, figures within parentheses represent *t*-statistic.

¹For the logic and procedure of the exercise, see [16, pp. 192-206].

²In fact, farm-size was also included as a further variable, but the relationship obtained between labour and farm-size for *HYV*-group was statistically insignificant.

Second, we augment the data matrix from F to $[D F]$, where D is a set of dummies valued zero for the observations in one class, and unity for another. Then we regress L on $[D F]$ for the two samples together. This allows each class to have a different intercept but imposes a common regression coefficient on both the classes.

$$L = 46.27 + 0.12 F + 7.28 D ; \quad R^2 = 0.23 \quad (2)$$

(20.54) (4.24) (2.05) S.S. = 42,659.69

Third, we fit a separate regression to the data for each class. For HYV, we get

$$L = 51.29 + 0.14 F ; \quad R^2 = 0.17 \quad (3)$$

(7.80) (2.79) S.S. = 13,656.66

For local variety, we have

$$L = 46.816 + 0.11 F ; \quad R^2 = 0.10 \quad (4)$$

(18.81) (3.17) S.S. = 28,936.19

Now, the tests of differential slopes and intercepts are given by the respective expressions³

$$F_{(s)} = \frac{S_3 / (pk - p - k + 1)}{S_4 / (p(m - k))} ;$$

$$F_{(i)} = \frac{S_1 / (p - 1)}{S_2 / (mp - p - k + 1)} .$$

where,

$$S_1 = \text{S.S. of (1)} - \text{S.S. of (2)} ;$$

$$= 1207.33$$

$$S_2 = \text{S.S. of (2)}$$

$$= 42,659.69$$

$$S_4 = \text{S.S. of (3)} + \text{S.S. of (4)}$$

$$= 42,592.85$$

$$S_3 = S_2 - S_4$$

$$= 66.84$$

$$p = \text{no. of samples} = 2$$

$$k = \text{no. of variables} = 2$$

$$n = mp = \text{no. of sample points} = 152.$$

Thus, from our computation, we find $F_s (1, 148) = 0.23$ to be insignificant, i.e., we do not reject the hypothesis of a common regression slope. Further, we find $F_i (1, 149) = 4.22$, and hence the 'intercept effect' is highly significant. We have thus shown (with only one uncontrolled variable, viz., fertilizer) that there is a significant variation in the use of labour in HYV and local varieties.

³See [16, p. 198], for explanation of the F-statistics,

Fiscal Financial Intervention, Factor Prices and Factor Proportions : A Review of Issues

by

SHANKAR N. ACHARYA*

I. INTRODUCTION

Widespread unemployment in LDCs is generally attributed to the scarcity of complementary factors, especially capital. But a variety of distortions in factor markets are alleged to underprice capital and overprice labor relative to social scarcity prices. Such price distortions are believed to induce inappropriate choices of technique and sectors of production, hindering a better utilization of factor endowments. Fiscal and financial systems clearly play a part in influencing factor prices faced by private producers. In very broad terms what one would like to know is:

- (a) which features of the fiscal/financial systems contribute to or alleviate factor market distortions, and something about their relative importance ;
- (b) what is the scope for fiscal and financial policy in correcting factor price distortions?

The entire exercise rests on the premise that "factor prices matter". The scope for factor-price intervention to shift to efficient factor combinations with more employment per unit of capital in the economy (whether on average or only at the increment) is limited by:

- (i) technological substitution possibilities within a "sector", "industry" or "product" ;
- (ii) the possibilities for changing the output mix in favour of labor-intensive "sectors", "industries" or "products" ;

* The author is an Economist at the World Bank. The views expressed here are his own and not necessarily those of the Bank. The paper has benefited from comments by numerous colleagues at the Bank and outside. For particularly helpful comments thanks are due to Montek Ahluwalia, Jack Duloy, Raj Krishna, Stanley Please, Daniel Schydrowsky, Lyn Squire and Octay Yenal.

- (iii) the responsiveness of producing units to price signals, and
- (iv) the success of intervention policies in changing prevailing factor prices in the desired direction.

This paper attempts a selective review of issues pertaining to each of the four limiting factors, listed above, constraining the effective deployment (or correction) of fiscal/financial measures to improve factor utilization. The plan of the paper is as follows. Section II addresses the production function approach to investigating available choice of technology. Section III takes a look at some of the micro-studies on capital-labor substitution and tries to distill the lessons. Section IV briefly discusses the influence of factor-price changes on output-mix, assuming profit-maximizing responses by producers. Section V explores the question whether decision-making units behave, at least approximately, as profit maximizers, in response to factor price changes, when choosing between techniques or whether other considerations dominate. Returning finally to the influences, current and potential, of fiscal/financial interventions on factor prices, Section VI critically surveys some theoretical attempts to isolate optimal intervention instruments, and draws some general lessons for theorizing in this field. The final section pulls together the conclusions arising from the discussion in earlier sections.

II. ECONOMETRIC ESTIMATES OF THE SCOPE FOR CAPITAL-LABOR SUBSTITUTION: SOME PROBLEMS

Three separate levels of problems may be distinguished:

- (A) Is there a meaningful production function at the levels of aggregation (in outputs and inputs) investigated in most studies?
- (B) Conceptual inadequacies of the two-factor CES production function.
- (C) Estimation problems which cast doubt on the reliability of parameters estimated.

This broad classificatory scheme will be used to list the problems with CES production function estimates in LDCs.

A. Does a Production Function Exist ?

All econometric estimations of neoclassical production functions have involved some degree of aggregation in either (or all of) outputs, capital inputs or labor inputs. Output is sometimes defined narrowly enough to be considered homogeneous. But labor and capital are always aggregates of heterogeneous elements which "differ in their longevity, impermanence, productive qualities, mobility, etc." [105, p. 1144]. For a production function to be interpreted to embody solely technological characteristics, it is necessary that the quantity of capital and labor, as defined in the function, be independent of both relative prices

and the distribution of income. The necessary and sufficient conditions permitting such aggregation are stringent [59].

The aggregation problem also rears its ugly head whenever the production function in question attempts to model more than one micro-economic production unit. Even if production in each unit is accurately conceptualized by a "well-behaved" neoclassical production function (i.e., the problem of nonhomogeneity of factors is assumed not to exist), Fisher [55] has demonstrated that very stringent restrictions need to be satisfied to permit aggregation across producing units and representation of production possibilities in a "sectoral" neoclassical production function.

B. The Two-factor CES Function : Some Limitations

In its most general form the two-factor CES function may be written thus:¹

$$Y = \gamma \left[\delta K^{-p} + (1-\delta)L^{-p} \right]^{-\frac{\mu}{p}} \dots (1)$$

where Y, K and L are the usual variables and γ , δ , μ and p are respectively, the parameters for efficiency, distribution, degrees of returns to scale and substitution. The elasticity of substitution (σ) is equal to $1/(1+p)$. The CES suffers from a number of limitations in modelling characteristics of production in LDCs :

(i) The assumed independence of the elasticity of substitution from factor proportions and scale is not supported by either casual empiricism or the few available micro-studies of production processes[33].

(ii) CES studies relying on "indirect" estimation (see sub-section C below) implicitly assume constant returns to scale to capital and labor. This is at odds with most studies, especially of process industries. More importantly, the CES cannot incorporate returns to scale which vary with factor proportions [33; 129; 137; 145].

(iii) Applied to production in an industry or sector, the CES assumes *ex post* malleability of factor-combinations (a "putty-putty" assumption). A "putty-clay" assumption would be much closer to reality.

(iv) Attempts to fit CES functions to LDC production sectors take value added as the measure of output. There is an implicit assumption that intermediate input requirements are in fixed proportion to gross output. Roemer [129, p.5] has pointed out "it is almost always possible to save raw materials, sometimes by

¹The function was formally introduced into economic literature in a celebrated article by Arrow, Chenery, Minhas and Solow [8].

adopting more efficient production processes".² More important, capital may be substituted more efficiently for intermediate inputs than labor.

(v) The two-factor CES suffers from the shortcoming of artificially conceptualizing the production process to be composed of only two primary factors, assumed to be homogeneous. In theory, the CES may be generalized to N factors in a number of ways. But the generalizations are either too complex to permit estimation, or too restrictive about the manner in which factors cooperate, to be believable [38; 104; 143; 160].

(vi) All too frequently the production function conceptualization treats capital as a stock, when it is the flow of capital services which is appropriate. As Winston [165, p. 29] points out, the distinction would be unimportant (it would reduce to a constant multiplier), if capital services per unit of capital stock were a constant, that is, there was a constant rate of capital utilization. But since the rate of utilization varies due to numerous reasons (including factor prices), the stock/flow distinction cannot be minimized in production function specification.

C. Estimation Problems

All applications of the CES to LDCs, of which I am aware, use the "indirect" method for estimating σ . Basically this relies on the assumption that competitive factor markets bring about equality between the marginal products of factors and their real earnings. Constant returns to scale are implicitly assumed to ensure that factor incomes add up to value added. The data for investigations consist either of observations (time series and/or cross-section) on firms in a sector in a country [130; 163] or for a sector, defined as uniformly as possible, across countries [48].

An imposing set of problems confront such empirical testing of CES production functions, the more important of which are the following:

(i) The methodology assumes that the data represent points on the production frontier, that is, all production units observed have adjusted fully to the prevailing factor prices. This is unrealistic.

(ii) For cross-section data, at any one time, different units will have accomplished different degrees of adjustment towards profit-maximizing factor combinations. In fact the discrepancy between actual and "best practice" combinations may reflect differences in managerial quality across firms.³ The analogous problem

²This becomes particularly important if the inputs are foreign (and domestically non-substitutable) and a foreign exchange constraint is operative.

³This is really one dimension of excluding management as a separate factor of production.

for time series data is the implicit assumption of full adjustment within the observation period. Attempts have been made to model lagged adjustment behaviour; [130 ; 163]. But mis-specification of the lag-structure biases the estimate of σ .

(iii) To correspond to points on a production frontier, the value-added data used should be value-added at "capacity". With few exceptions [20], the studies do not make adjustments for under-utilization of capacity.

(iv) All studies need to assume that the observed production units employ techniques derived from the same production function. This would appear to be a particularly difficult condition to satisfy for a cross-section of units in LDCs. The breach of the assumption would imply that the econometric estimates of σ relate not to the substitution possibilities of a unique production function, but rather they reflect, in some average way, the "varying responses to market conditions of firms producing with different vintages of technology" [130, p.3]. For estimation based on time-series data, the analogous problem is that of correctly specifying the nature of technological change.

(v) All too often the definition of sectors is so aggregative, that the elasticity of substitution estimates based on time series data subsume substitution of one kind of products for another intra-sectorally. This change in output mix may or may not be due solely to changes in factor prices. In both cases the meaning of the measured elasticity is unclear.

(vi) Again, if time series data from an inflationary situation are used, undeflated [65], then, assuming the CES captures the true production relation, variations in the rate of inflation bias the estimate of σ towards unity [110]. Even in cross-section, if undeflated data are used and prices are positively correlated with nominal wages, a bias towards unity occurs [107].

(vii) For cross-section estimates the neglect of differentials in quality of labor across observation units biases the estimate of σ towards unity [60].

A number of direct estimation procedures have emerged over the past decade [44; 45; 80; 81; 105; 169]. However, none of these estimation procedures and other more sophisticated variants in the pipeline have yet been usefully deployed on LDC data. Until they are, the strictures levelled against the indirect estimation method remain pertinent.

III. CHOICE OF TECHNOLOGY: WHAT DO MICRO-STUDIES TELL US ?⁴

Some Early Case Studies

Some of the best early micro-studies on the choice of technique were done in the Netherland Economic Institute during 1956-62 by a research team headed by Gerard K. Boon.

The results were published in a series of progress reports; Boon, *et al.* [28;-29; 30; 31; 32]. Much of the work was subsequently synthesized in Boon [33]. Boon presented detailed analyses of alternative methods for "single, isolated" industrial processes such as metal-turning and metal-facing, for "a group of processes" which together produce a specified industrial product (in his case, woodworking to produce window frames), for "single" agricultural processes such as ploughing and making field trenches, and for a "group of processes" in producing foodgrains. In each case attempts were made to cost techniques for different output scales to arrive at optimal techniques given scale and factor prices. The broad conclusions Boon derived from these studies were:

(i) for industrial processes, profit-maximizing (cost minimizing) factor proportions were quite sensitive to factor prices for "lower output brackets", but such sensitivity diminished with higher output ranges, where capital-intensive techniques tended to be optimal over wide ranges of factor prices,

(ii) for agricultural and earth-moving processes, the available range of efficient techniques was generally wide, "regardless of the volume of production", implying substantial sensitivity of cost-minimizing factor proportions to factor prices.

Another early set of micro-studies on choice of technique was precipitated by the debate on Indian policy vis-a-vis employment potential of small-scale industries, in the late 1950's and early 1960's. Bhalla [24; 25] conducted studies comparing alternative techniques for cotton spinning and rice milling, while Sen [133] analyzed technological choices in cotton weaving.⁵ In cotton spinning Bhalla found traditional labor-intensive methods more profitable at prevailing factor prices than factory methods, but the Gandhian Ambhar Charka was inefficient relative to both the other techniques at prevailing prices. In rice milling, the scale economies associated with machine milling were large enough for Bhalla to find these techniques more profitable to a variety of hand-pounding methods, at the

⁴What was stated earlier in general, holds true for this section. It is not a comprehensive review of literature on micro-studies. That would unnecessarily duplicate some recent review studies such [66; 101; 145; 146].

⁵See also Dhar and Lydall [51].

prices employed in the comparison.⁶ In a more sophisticated analysis, using shadow prices to cost factors, Sen found the labor-intensive fly-shuttle handloom technique to be much more socially profitable than the automatic power loom in Indian cotton weaving. Unlike Boon's investigations, these studies did not explore the implications for profitability of alternative techniques as factor prices were varied. In other words, the scope for efficient factor substitution was not systematically studied.

These early studies have been subjected to several criticisms by recent, researchers : ⁷

(i) Stewart [145] characterizes Boon's insistence on product homogeneity for technique comparisons as a source of downward bias in computing the scope for capital-labor substitution. She argues that the traditional investigation of scope for factor substitution in two stages, at the product-mix level stage, tends to encourage "adopting different definitions of product at the different stages of the argument" [145, p. 111].⁸ Typically, the variability of factor proportions from altering product-mix are investigated at a fairly aggregated level. But when intraproduct technique choice is explored, the premium placed on product homogeneity leads to over-specification of the product so that it is no longer representative of the output category from which it is taken. And over-specification tends to squeeze out choice of technique. To reduce this danger from combining noncomparable product definitions, Stewart advocates replacing the product-mix/technique-choice sequence, with a sequence which would encourage exploration of the possibility for "varying goods (in terms of physical characteristics) for fulfilling given needs" [145, p. 111].⁹

(ii) Like production function analyses, most micro-studies fail to account for indirect capital/labor requirements of alternative process [83]. Such neglect refers not just to requirements for intermediate goods and services used in the processes under study, but also to the factor requirements for producing the different capital goods used in the different processes. On the latter point, in the absence of neoclassically perfect markets, purchase values of different capital

⁶A number of objections can be made against Bhalla's assumptions for costing factors, particularly capital.

⁷For those wishing to broaden the sample of research reported here, a number of other references (by no means exhaustive) may be cited : UNECLA [157] studies of textiles in Latin America, a series of studies by Baranson [11; 12; 13; 14; 15] focusing on the vehicle industries, Marsden [96] and Sharpston [137].

⁸Emphasis mine. If the definition did not alter, this criticism of Stewart's would be irrelevant.

⁹Her analysis draws on Lancaster's [85] attempt to reshape consumer theory in terms of basic human needs.

assets cannot be taken as adequate measures of "capital" directly required for the process.

(iii) Most importantly, the characterization of alternative processes or techniques for manufacturing a given product or service, as a point in two-dimensional capital-labor space is either ludicrously naive or must encapsulate a series of economic/engineering choices at different "stages" encountered in the manufacture of the product. Even simple products boast numerous stages of production, each of which could be conceptualized as a "process" allowing certain choices.¹⁰ Nor are choices at each stage independent of choices at earlier and subsequent stages. And the potential of joint production possibilities at each stage seriously complicates matters. These, and other points, silhouetting the complexity of real-world production against the naive backdrop of economic theorizing, have been forcefully made by Nam, Rhee, and Westphal [106], Sharpston [137] and Stewart [145].

More Recent Research: The ILO Program

Since early 1972 the ILO has sponsored a major research program on Technology and Employment as a substantial component of the World Employment Program's employment-related research. The program has begun to yield a rich crop of micro-studies, some finalized, some in early draft form and some ongoing.¹¹

The studies on the employment implications of different agricultural production techniques emphasize that, in this area, choice of technique (from a given production function) questions are inextricably linked with technical progress questions (i.e., shifts in the production function). They also underline the importance of natural resource factors such as soil quality, terrain and climate in defining the scope for adopting alternative techniques [142]. Another important complication in predicting employment implications of adopting alternative techniques, found by researchers, is the relative importance (and differential impact) of alternative organizational modes (e.g., capitalist vs. family farms) under which the labor input is utilized in agricultural production.

In manufacturing, the two studies of cotton and jute textiles, constitute interesting explorations of the rationality of using older used equipment in preference to the latest machines, in new LDC textile ventures. Pack [112] draws on the detailed industrial information compiled by the U.K. Textile Council [155]

¹⁰Stewart [143] disaggregated the production of a simple commodity, cement blocks, into eight separate stages of production.

¹¹See ILO [70] for a complete listing.

in its effort to gauge the viability of the U.K. textiles industry in the face of competition from low-wage countries. Despite several qualifications, Pack [112, p.3] feels that his analysis "suggests that at factor prices relevant for many poorer countries, the choice of used equipment would be optimal". One of the major qualifications is the legitimacy of Pack's assumption that the "productivity of the various vintages or types of equipment would be the same in the LDC as it is in the U.K." [112, p. 31]. Cooper and Kaplinsky's [46] study of the economic appropriateness of second-hand jute processing machinery in Kenya underlines the fragility of this assumption. They highlight the much greater uncertainty and risk, from the purchaser's viewpoint, clouding the technical efficiency of old, transplanted equipment, compared to new. Such uncertainty invalidates generalizations about the economic appropriateness of older used machinery for LDCs. But both studies indicate that with careful selection second-hand textile machines can often be the optimal technique in LDCs.

The two studies of techniques of road construction, which have issued progress reports so far, both point to the presence of efficient alternative techniques. Lal's [84] work is based on *ex ante* engineering data for a 5.76 km. pilot gravel road. Lal uses Little-Mirrlees [89] project evaluation procedures to show that the labor-intensive technique is more socially profitable at both market and shadow prices.¹² When it comes to concrete paving of the gravel road, the capital-intensive technique is marginally cheaper at market prices and the ranking becomes sensitive to the specification of shadow factor costs. The study by Irvin, *et al.* [71] includes a sample of five roads. The choice of optimal technique was found to be sensitive to specification of distributional and intertemporal weights. Incidentally, the UNIDO system of shadow-pricing was adopted, thus complicating comparisons with the Lal study. The five-road sample permitted the researchers to demonstrate that the factor-input requirements of the alternative techniques varied with road type and terrain, thus sounding a caution on generalizations about appropriate road construction techniques based on single pilot-case studies.

Other Studies

The World Bank has been participating in several major research projects in the field of technology choice. A research project on civil construction draws on direct observations of road construction techniques in India, Indonesia and Nepal. Even more than the ILO road construction studies (the IBRD project

¹²In these comparisons between different techniques of road construction the term "technique" is used as a short-hand form of reference to a particular set of techniques used, one for each of the "tasks" into which road construction was disaggregated for analysis.

was launched before these) this study disaggregates road construction into sub-components: "tasks" and "activities", and prepares alternative input-output coefficients for them [64, p. 13]. The authors claim that "the study clearly indicates that labor-intensive construction techniques traditionally practiced in many developing countries are not economically competitive with equipment-intensive technology under most conceivable factor prices and environmental conditions" [64, p. viii]. This strong claim conflicts with the results of the two ILO studies discussed earlier. A thorough relative evaluation of these studies would constitute a major exercise, outside the scope of this paper. Suffice to say that much of the discrepancy in results appears attributable to different input productivity assumptions. While the more thorough development of engineering data in the IBRD study might vest it with stronger credibility, caution suggests that the concluding remarks of one of the ILO studies have captured a more prudent tone: "these conclusions remain tentative primarily because of the lack of firm, relevant technical data on the local relative productivities of men and machines" [84, p. 196].

Another World Bank study entailing detailed modelling of the Mexican agricultural sector yields some interesting results on factor substitution. Based on simulations with the 33-crop CHAC model [53;108] conclude that if factor-substitution in the agricultural sector is interpreted to refer to substitution between agricultural machinery and on-farm labor (hired and own-account), holding other factors constant, then the elasticities are very high, ranging from 1.0 to above 3.0, varying with different isoquant definitions employed in their study. Amongst other things these results highlight the importance of disaggregating capital stock concepts into appropriate sub-categories for sectoral factor-substitution investigations.

The above account of ongoing micro-study research into choice of technology is by no means exhaustive. Two other significant research efforts deserve mention in even an incomplete review. The University of Strathclyde's Overseas Development Institute is engaged in a major project to investigate choice of technique (and the reasons for appropriate and inappropriate choice) in a wide spectrum of industrial sectors in LDCs. The results of pilot investigations into sugar refining and footwear manufacture in Ghana and Ethiopia have already been reported in Pickett, *et al.* [116]. Meanwhile, the Yale University Economic Growth Centre has begun work on a three-year research effort into micro-economics of industrial technology choice under the overall direction of Professors Ranis and Fei.

IV. FACTOR PRICES AND OUTPUT-MIX

There is hardly any empirical work which quantifies the dimensions of the influence of factor prices on factor proportions via the output-mix ... "indirect substitution" as it is sometimes called [42]. This is not because choice of output-mix is seen to offer little scope for improvements in total economy-wide factor proportions employed. Quite the contrary. Many analysts feel that variations in output-mix provide the best hope for altering economy-wide factor proportions in the desired direction. Much of their optimism comes from a faith in highly elastic foreign demand for possible labor-intensive LDC exports [10; 21; 22; 68; 79; 87; 90]. But these same analysts tend to relegate the scope of factor-price intervention for altering output-mix to the background, preferring to focus on the structure of output taxes and subsidies, explicit or implicit in the foreign trade/exchange and fiscal regimes.

On the face of it this tendency would appear to conflict with the theoretical dicta of the literature on optimal intervention in the presence of domestic distortions.¹³ This literature teaches that if the distortions (from competitive equilibrium) are in the factor markets, first-best correctives should focus there. But in arriving at these conclusions the models assume competitive conditions in all areas of the economy save for the factor market distortions under analysis. As against this, the OECD studies referred to earlier, dwell on economies cluttered with myriad foreign-trade controls and tax-subsidy interventions which underlie broad import-substitution strategies. In such contexts, the focus on reforming output taxes and subsidies, implicit or explicit in foreign trade/exchange and fiscal regimes is a theoretically sound strategy for altering an economy's output-mix to bring it in closer correspondence to the country's comparative advantage.

"Getting the factor prices right" can, of course, also play a role in bringing the economy's production mix more in line with its comparative advantage. After all, variations in factor prices also influence the relative profitability of different products. But this influence is filtered through the complicating choice of technique factor, making the final effect on relative sectoral profitability much harder to predict.

Conversely, when looking at historical data on the evolution of output-mix in a country, it is extremely difficult to isolate the effect of altering factor prices from all the other influences on relative profitability, stemming from changes in

¹³This literature is now voluminous. Two classic pieces are Bhagwati and Ramaswami [23] and Johnson [73]. For a recent literature survey, see Magee [95].

effective tariffs, quotas, domestic output tax/subsidies, price support schemes and such. Over fairly long time-spans, the influence of altering factor prices may, sometimes, be qualitatively discerned. Ranis [121], interprets the changing composition of Japanese output-mix (and techniques for each product) between 1868 and 1930 from an initial dominance of labor-intensive products for foreign and domestic markets to gradually increasing importance of capital intensive production as a response to altering factor endowments and prices. But even over this long historical cycle, he does not try to distinguish the factor price effects from other "price variables" which undoubtedly affected the character of Japanese development.

V. DO PRODUCERS RESPOND TO PRICE SIGNALS IN CHOOSING TECHNIQUE ?

Granted that for a wide range of products there is considerable choice of technique, do entrepreneurs respond to factor prices in making their choices, or are they guided by other desiderata which swamp the factor price signals? Before citing some research which throws up cases of "perverse" (that is non-cost-minimizing) behaviour, a few cautionary remarks on the notion of "available technology" are in order.

The phrase begs the question: to whom and at what price? Even the range of "best-practice" techniques, at the current "state of the art" (that is abstracting from technical progress) is not a sharply defined set from which producers may hypothetically shop. For example, nearly all responses of the Intermediate Technology Development Group¹⁴ for information on available technology have involved both the transfer of information on the "state of the art" and minor innovations [146]. And even if we grant a more or less definable set of "best-practice" techniques at the current "state of the art", access to this set varies enormously amongst producers. Information costs money, and since the market for information is very imperfect, the price for the same unit of technological information can vary enormously amongst producers.¹⁵ The problem of imperfect information on "best practice" technology is severely compounded when the source of information is foreign. For industrial sectors, where LDCs are usually heavily reliant on technology imported from developed countries, the dynamic labor-saving bias of innovations in these countries [113 ; 146] is

¹⁴The now famous institute founded by Dr. Schumacher.

¹⁵This in turn points to major socially profitable roles for transfer mechanisms (including technology institutes) to close and equalize the gap between "best practice" possibilities and actual choices faced by the producer.

likely to make the latest machinery the least appropriate from the LDC's viewpoint. Yet these are precisely the items on which foreign salesmen are best informed.¹⁶ Information on foreign secondhand machinery is much scantier. And, abstracting from the temporal dimension, the effect of aid-tying and the spread of developed country based multinational corporations, both work to bias a poor country's technology shopping against foreign sources which may reflect factor endowments closer to that of the importing country [146].

Choice of "inappropriate" technology may occur due to either lack of information to or non-cost-minimizing behavior by the decision maker. An illustration is provided by the ongoing, and much-mentioned, University of Strathclyde research on choice of technology. In a preliminary paper, Picket, *et al.* [117] report on cases of inappropriate technique choice in sugar production in Ghana and footwear production in both Ghana and Ethiopia. Using process information from a variety of countries, Picket, *et al.* conclude that (a) there is substantial choice amongst "best practice" sugar production techniques, (b) even at "distorted" market (and more so at shadow prices) the labor-intensive Khandsari techniques were more profitable than the capital-intensive vacuum pan process, and yet (c) the capital-intensive process was actually chosen. Similar paradoxical behavior is reported for footwear production, with the important difference that the techniques costed and compared were not actually in use anywhere, but were "'synthetic' techniques ... (which) have no counterpart in reality. They are, however, technologically feasible combinations of existing sub-processes or operations" [117, p. 49].

Picket, *et al.* attribute the paradox to the "malign influence of the engineer and...the conceit of the economist" [117, p. 51]. More simply, engineers trained in developed (capital-rich) country moulds embody a labor-saving bias in their mapping of blue-print choices. Because they love machines, they only design choices amongst a small range of capital-intensive options. And economists, imbued by the Schumpeterian conceit that technical choices nurtured in a given economic environment must reflect the prevailing scarcities, do not conduct independent searches for possible techniques from other parts of the production function.

A study which directly challenges the strength of the cost-minimizing/profit-maximizing hypothesis is Wells' [161] analysis of technique choices in half

¹⁶Pack and Todaro [113] however, are skeptical about the potential of older imported machinery for optimal technology decisions. They favor indigenous capital-goods industries structured to bias technological progress in favor of labor-intensive segments of the isoquant map.

a dozen light manufacturing industries in Indonesia.¹⁷ In most of these industries the co-existence of alternative techniques (in the same country at the same time) makes it difficult to use "inadequate information" arguments to explain inappropriate technique choices. Wells argues that businessmen are not solely "economic men" who are driven by motives of profit-maximization/cost-minimization, but rather they embody a more complex objective function which includes "engineering man" love of automation and machines *per se*. As to the relative importance of the two motives, Wells sees this as varying with market structure. In a competitive industry, "survival" of the firm rests on the dominance of "economic man" over "engineering man". But if the entrepreneur is a monopolist (foreign or domestic) he is much more likely to indulge the "engineering man" aspect of his psyche with non-profit-maximizing, capital-intensive technique choice.¹⁸

Wells' analysis is often qualitative and difficult to grapple with. In particular, the complexity of his hypothesized objective function (for entrepreneurs) makes for limited stability. In any case, Wells is not saying that factor prices don't matter, but that in certain situations (of monopoly and oligopoly) they may not be the only explicands of technique choice. Such a position certainly complicates the already difficult task of predicting factor demand changes arising from manipulated factor-price changes. But it does not vitiate the policy role of factor-price intervention.¹⁹

¹⁷Fifty plants were sampled in six industries : plastic sandals, cigarettes, soft drink bottling, bicycle and betjak tires, flashlight batteries and woven bags.

¹⁸One group of private producers have recently attracted growing attention about their factor proportion response to factor prices. These are the subsidiaries of developed country multinationals (mainly from the U.S) in LDCs. According to conventional wisdom these units follow metropolitan production design and do not adapt factor combinations in response to local factor market conditions. Available research offers weak support for this view. Yeoman [167] found little difference in factor-proportions between metropolitan and LDC subsidiaries of thirteen U.S. firms. Though suggestive, the evidence is not conclusive without supporting information on choice of technique. Arguing that local firms might use more appropriate techniques, if these were available, Mason [97] compared factor proportions of U.S. subsidiaries and locally-owned firms in Philippines and Mexico, making comparable products. His tests were not conclusive in showing a bias in favor of capital-intensive techniques by multinational subsidiaries. In a preliminary comparison of metropolitan U.S. units and their Brazilian subsidiaries in metal-working industry. Morley and Smith [103] do find differences in factor prices between Brazil and the U.S. While hinting at relatively little scope for capital-labor substitution, they are cautious to point to the satisfying behaviour of the Brazilian subsidiaries which inhibits them from searching for labor-intensive alternatives.

¹⁹It is difficult to disentangle this "machine love" hypothesis from an alternative explanation, often put forward by entrepreneurs, which attributes apparently "inappropriate" technique choices to the non-monetized costs associated with managing labor. In this view wages constitute only a component of cost of labor as perceived by employers.

Given the explanatory power of the profit-maximizing hypothesis in so many other areas of economics, including even amongst allegedly tradition-bound peasant farmers,²⁰ it would be very unusual if private agents suddenly abandoned such motives when it came to technique choice.²¹ And even in the arena of technique choice there is considerable quantitative, but nonrigorous, evidence of private agents responding to factor prices. In most countries fragmented factor markets ensure widely divergent factor price relatives between "formal" and "informal" sectors, with the latter facing a much higher relative price of capital. This is associated with the coexistence in the same "industry" of capital-intensive techniques in the formal sector with labor-intensive techniques in the informal sector.²² And such association is certainly consistent with profit-maximizing hypotheses. Problems with product homogeneity, quality differences and conceptual difficulties of including the time dimension, render it difficult to make stronger statements based on such associations.

VI. FACTOR PRICE INTERVENTION: WHAT LESSONS FROM THEORY?

The hypothesis that factor prices have some (undetermined in magnitude) effect on economy-wide factor combinations leaves open the question of the role, current and potential, played by fiscal/financial elements. One can readily enumerate fiscal/financial features which may be presumed to have a direct influence on relative factor prices :²³

-payroll taxes; social security contributions ;

²⁰See, for example, literature on price-sensitivity of farmers referred to in Krishna [82] and Behrman [19]. Schultz [132] discusses studies supporting allocative efficiency by traditional peasants.

²¹This does deny that public decision-makers often make decisions including those on technique, for considerations other than profit-maximization. Thomas [152] records the choice of an intermediate (in preference to labor-intensive) technology for tubewells in Bangladesh (the then East Pakistan) because of the organizational preferences, "machine love" and other prejudices of both the aid donors and the local implementing agencies, even though the labor-intensive technique was socially more profitable.

²²See, for example, Khan [78] and Acharya [1] for such a view of Pakistan and Ranis [125] for Taiwan.

²³A caveat is in order here. While all fiscal/financial intervention in a general equilibrium model may influence equilibrium factor prices ("everything depends on everything else") this paper is restricted to interventions which bear directly on factor prices. Furthermore, this section is somewhat low brow and positivist in spirit. It is more concerned with how different fiscal/financial interventions may be expected to influence factor prices than with pronouncing on optimal degrees of intervention. There is a body of formally elegant literature on optimal taxation, which should, in principle provide guidance on the latter aspect. See, for example Diamond and Mirrlees [52] and Dasgupta and Stiglitz [49]. The practical utility of these theoretical results is quite another matter.

- taxes/subsidies on wage goods ;
- labor subsidies ;
- interest rates/credit availabilities ;
- investment allowances and tax holidays given profits and/or corporate income taxation ;
- discriminatory tariffs on capital equipment ;
- foreign exchange allocation regime ;
- taxation of capacity.

Prima facie it would appear to be a simple matter to aggregate the incentives/disincentives of these measures and form a judgment on the extent to which they make relative factor prices different from what they would otherwise have been. One could then evaluate the efficiency of the various instruments in terms of bringing about a specified change in relative factor prices with minimum distortive repercussions elsewhere in the economy. Based on such an evaluation one would choose to retain and expand the scope of certain instruments and jettison others. Unfortunately, matters are not so simple. The anticipated impact of different interventions on relative factor prices depends crucially on the underlying general model of the economic system. This section illustrates this proposition with a couple of examples from the theoretical literature. It goes on to question the utility of such simple models for assessing the effect of intervention, pointing out key real-world features, such as fragmentation of factor markets and non-zero, non-infinite factor supply elasticities, which need to be incorporated in the analysis.

The Peacock/ Shaw Analysis

One route in search of theoretical guidelines is partial equilibrium and micro-economic. This is the approach taken by Peacock and Shaw [114] in their OECD review of fiscal policies for employment. They analyze the first order profit maximizing conditions of a firm which is assumed to produce according to a two-factor, constant returns to scale Cobb-Douglas production function and to purchase factors in competitive markets at fixed prices. For "convenience" they further assume that the output demand curve facing the firm is such as to imply a rectangularly hyperbolic marginal revenue curve. This allows them to analyze the effects of fiscal interventions knowing total firm outlays on factors to be constant. Within this restrictive framework it is easy to show that the profit maximizing level of employment of each factor depends solely on its price and that factor's exponent in the production function. And since the factors are assumed to be in perfectly elastic supply to the firm, a factor tax (subsidy) changes the factor price by the full amount of the tax (subsidy). This means that subsidy (tax) on labor will

increase (decrease) both output and employment without affecting the optimal quantity of capital, while a capital tax(subsidy) will reduce both output and the quantity of capital used, without influencing the employment of labor.

Peacock/Shaw recognizes the embarrassingly optimistic scope for factor subsidies in this purely micro-economic framework. To inject some notion of alternative resource cost at the macro level, they informally introduce a government budget constraint. This is done by assuming "every firm in the economy pays an equivalent amount of tax for any subsidy received" [114,p. 69]. The effects of such compensated fiscal intervention are then analyzed. It is shown that a capital tax (compensated by an equivalent output subsidy) and a labor subsidy (compensated by an output tax) both lead to smaller firm output, higher labor employment and lower capital use than in the case of no fiscal intervention. In other words, employment of labor can be increased, but there is an output-employment trade-off. Peacock/Shaw also show that "the employment impact of the two self-financing measures will not be identical for fiscal measures of equal size". The effect will depend on the size of the Cobb-Douglas exponents. In particular, if the labor exponent (which also models labor share in output for Cobb-Douglas under constant returns) is greater than 0.5, as economy wage shares would lead one to believe, then capital taxation is more efficient than labor subsidy in terms of employment increase "per unit of fiscal intervention". For this and administrative reasons Peacock/Shaw prefer capital taxation to labor subsidy.

The Peacock/Shaw analysis is subject to a number of serious, and cumulatively fatal, objections:

(i) the generality of their results at the micro-economic level is severely qualified by their very specific assumptions about conditions of production and output demand;

(ii) their concept of compensated fiscal interventions is, at best, arbitrary;

(iii) their use of an informally treated economy-wide budget constraint to transfer the results of micro-economic, partial equilibrium analysis to the general, macro-economic level is theoretically insupportable. Indeed, there is even an element of internal inconsistency in their reasoning. While they recognize the need for incorporating an economy-wide capital constraint into the analysis [114,p.69], they do not do so explicitly, being content to hint that their introduction of the budget constraint is an adequate proxy. This won't do. It is easy to show why. The compensated capital tax case leads to more employment of labor, less of capital, less output for all firms, compared to no fiscal intervention. This means, compared to the latter situation when, *ex hypothesi*, capital stock is fully utilized (otherwise it can't be a constraint on

output), compensated capital taxation releases some capital. Where does it go? The budget continues to be balanced, but capital is now under-utilized. In other words, the assumed capital constraint has not been properly accounted for ;

(iv) most important of all, the Peacock/Shaw assumptions of perfectly elastic supply of both factors at the micro level, cannot be transferred meaningfully to the macro setting. And if, for the economy as a whole, these factor supply elasticity assumptions cannot be made, then the whole question of how factor taxes (subsidies) will affect equilibrium factor prices becomes moot and central to the evaluation of factor employment effects. To sum up, the Peacock/Shaw analysis is theoretically too unsound to form a basis for intervention policy. In particular, the absence of an explicit general model tempts them to illegitimately transfer micro-economic results to the macro level.

The Ahluwalia Model²⁴

In pleasing contrast to the Peacock/Shaw work, Ahluwalia [4;5] tackles the assessment of fiscal intervention on factor prices in an explicitly hypothesized, though simple, formal model pitched at the general level.²⁵ The economy is assumed to be partitioned into two segments. The overpopulated subsistence segment produces "food" for its own consumption with an unspecified technology, but with zero marginal product of labor. It has no product or capital flow links with the modern segment. Its only role in the model is to offer a perfectly elastic supply of labor to the modern segment in a two-sector economy, with "food" and "manufacturing" produced according to two-factor, constant-returns-to scale neoclassical production functions. Within the modern segment factor and product markets are assumed perfectly competitive and capital is conveniently assumed to be a "homogeneous, malleable, physical commodity". The minimum wage in the modern segment is fixed in terms of food.

Ahluwalia shows that under these assumptions, for a given minimum real wage, the model yields an equilibrium solution for the modern segment of the economy where the following are determined :

- (i) choice of technique in each sector ;
- (ii) relative price of manufactures to food ;

²⁴Strictly speaking, this should be called the Ahluwalia-Brecher model. Brecher [34; 35], at about the same time and working independently, developed an almost identical model to explore the analytics of foreign trade intervention.

²⁵It is not a completely general equilibrium treatment since, as Ahluwalia [5, p. 408] himself recognizes: "An important weakness in the model is the absence of endogenously determined demand".

- (iii) the production possibility curve;
- (iv) the level of employment.

Heuristically, fixing the minimum real wage in terms of food immediately yields the profit-maximizing technique (the K/L ratio) and profit rate in the food sector (a convenient property of constant return to scale). Competitive factor markets ensure that the wage-rental ratio in food also prevails in manufacturing, immediately yielding the choice of technique in that industry. And in this model there is a one-to-one relation between factor price ratios and product price ratios. So once the first is known the latter is determined. Given the modern segment capital endowment and the K/L ratio in each sector, labor employment in the modern sector is known. And the production possibility "curve" is a locus of profit maximizing production combinations for the given product price ratio (corresponding to the minimum-wage-determined factor price ratio) for differing levels of modern segment labor employment, given the modern segment capital stock.²⁶

Ahluwalia goes on to show that a general labor subsidy increases both output and employment in the modern segment of the economy. Basically, a labor subsidy involves working through the model for a lower effective minimum real wage. As one would expect this implies an outward shift in the production possibility "curve", or, in other words, the economy now works on a higher Rybczynski line, corresponding to the lower minimum real wage. Conversely, a general labor tax would reduce employment and output in the modern sector. So the micro-economic perception of Peacock and Shaw (not to mention conventional wisdom) survives transfer to this more general model. The same cannot be said for a general capital tax. In sharp contrast to the Peacock/Shaw analysis and conventional wisdom, such a tax (or subsidy) leaves equilibrium output, employment, and choices of technique unaffected.

The reason for this asymmetry in factor taxation is straight forward. It simply reflects the asymmetry in assumptions about the elasticity of factor supply to the modern segment. Labor is assumed to be in perfectly elastic supply at the given minimum real wage. So any tax (subsidy) on labor shifts the supply curve by the full amount of the tax (subsidy). It is not borne (enjoyed) by labor. In contrast, the fixed stock of capital, like Ricardian land, bears the full burden of a capital tax. Its effective price from the production view point is not altered by the intervention. Owners of the factor have to settle for lower (by the amount of the tax) rewards.

²⁶It is in fact a straight line in this case and trade theorists will readily recognize it as simply the Rybczynski line for a given product price ratio [131].

What Lessons ?

Some lessons can be drawn from this brief discussion of two attempts to create an analytical framework to assess factor-price interventions. First, the most general and also the most important lesson is that the optimal choice of intervention instruments is sensitive to specification of how the economy works. To draw the same lesson differently, the assessment of the distortive influence of existing factor-price interventions is sensitive to assumptions about the economy. Second, and more particularly, the transfer of results derived from micro-economic analysis to a general level is an exercise fraught with danger. This should not be interpreted to vest the particular general model discussed here, Ahluwalia's, with legitimacy. While it offers a corrective view on Peacock/Shaw's partial equilibrium work, many of its assumptions (to which the analytical results are sensitive) conflict with reality. In this context, it is important to raise two important questions relating to factor supply conditions and factor market fragmentation.

Factor Supply Conditions

Nothing was said in earlier sections about factor supply conditions. Once one departs from the polar assumptions in Ahluwalia and other Lewis-type [88] labor-surplus models, the evaluation of factor-price intervention becomes enmeshed in tax incidence theory. The question is how effective is a given factor-price intervention in actually changing factor prices? Most of the empirically-oriented controversy has centered around who bears the payroll taxes for social security.²⁷ Such taxes usually have two components, the employers' contribution and the workers'. Treating both as one tax paid by employers for the moment, in the Lewis-type model there is no shifting of the tax at all. The employer bears the full burden and the tax fully increases the cost of labor to producers. The opposite case would occur if the supply of labor were completely inelastic. Employers could then shift the entire tax to workers, reducing the latter's take home pay by the full amount. Since the cost of labor to producers would be unchanged, the tax could be deemed to have no distortive influence on factor prices. If labor supply conditions fall between these two-extremes, the degree of shifting can no longer be deduced on the basis of supply alone.²⁸

²⁷Lent [86] and Prest [119] provide good discussion of the question. On the importance of payroll taxes in social security finance, Reviglio [127] provides cross-country data. For more general reviews of tax incidence theory, see Miezowski [98] and McLure [93]. Brittain [36] provides one of the few attempts at empirically establishing the incidence of such taxes.

²⁸As elsewhere in this Section, the discussion assumes a general factor tax (subsidy). The effect of selective measures is usually more complex, sometimes indeterminate and obviously depends on the nature of the selectivity.

Given the importance of the incidence issue to the question of how factor tax-subsidies influence factor prices and combinations, one might expect considerable empirical literature in this field. But that expectation is disappointed. Brittain's [36] investigation into the incidence of social security employers' taxes, using cross-country data for manufacturing sectors, is an exception. His overall finding was that "the presence of a payroll tax on employers tends to reduce the wage in dollars by roughly the amount of the tax" [36, p. 122]. And Brittain seems to take it for granted that the employees' tax is borne fully by them. He does not hesitate to draw, for his results, the conclusion that "payroll taxes are neutral with respect to the allocation of capital and labor in the aggregate and within a given industry".

Brittain's theoretical reasoning and econometric methodology have been seriously challenged by Feldstein [54]. Without going into the details of the rather acrimonious debate which ensued, one can extract the central point, namely, the acceptance by Brittain [37, p. 740] of Feldstein's charge that the former's estimated equation for modelling the shifting of the employers' tax can be interpreted as just the demand function for labor. It says nothing about supply. The estimated positive "shift" parameter then simply implies "that the payroll tax comes out of the real demand price for labor" [37, p. 742]. This is not a particularly startling result. It is certainly not equivalent to the claim that these taxes are "neutral with respect to the allocation of capital and labor". That conclusion would only be valid if supply was perfectly inelastic. Brittain's theoretical reasoning in favor of such inelasticity is flawed and is totally at variance with the long (almost venerable) tradition of labor surplus/dual economy theorizing. The proper econometric approach to the problem would involve specifying (and identifying) separate demand and supply function for labor. This remains to be done.

As for supply elasticities for capital the existing stock of physical capital may be taken to be in perfectly inelastic supply, though utilization can clearly vary.²⁹ But increments to the existing capital stock, through savings-investment, could be sensitive to the anticipated return. Most of the literature on savings determinants, however, suggests that income and rates of change in income are the main determinants of an economy's domestic savings [99; 141], and the price of this fresh capital only becomes important for allocation between alternative techniques and sectors.³⁰

²⁹Changes in utilization do create further conceptual difficulties for the "price of capital". As Winston [29] points out, what neoclassicists, such as Jorgenson [74] have termed the "service price of capital", is in fact the "price of owning a capital stock for a period of calendar time" which is not the same as a price for machine-hours used.

³⁰We abstract from price-induced inter-country capital flows.

Factor Market Fragmentation

A second important criticism of the Ahluwalia model, applies to both factor supply and demand conditions, and raises the most intractable problems of both theory and practice. Basically it urges recognition of factor market fragmentation in the assessment and design of factor-price intervention. This is easier said than done. Given the existence of multiple, imperfectly linked markets for factors, it is no longer clear that focusing on factor-price intervention in one market is all that important. Heuristically, it would appear that efforts at market unification should be the first order of the day. The simultaneous prevalence of different factor prices in different sub-markets suggests scope for efficiency gain via inter-market factor allocations, quite apart from any intervention policy designed to correct (alter) prices in the ultimately unified markets. And the design of strategies for factor market unification may require a very different kind of focus, dwelling on the impediments to inter-sub-market factor flows and the correction of discriminatory pricing of factors amongst different sub-markets. At the very least, factor-price intervention policy aimed at one sub-market should recognize and allow for repercussions such a policy may have (possibly perverse) in other sub-markets.³¹

VII. CONCLUSIONS

The time has come to bring together the perceptions and prejudices arising from the review of issues conducted in this paper.³² The paper began by outlining four main types of limitations to the "scope for factor-price intervention to shift to efficient factor combinations with more employment per unit of capital in the economy". The summary perceptions may be grouped in the same format.

³¹The importance of diagnosing inter-sub-market linkages for formulating first-best intervention policy, is illustrated, for labor markets, in the simple model by Harris and Todaro [66].

³²To repeat the obvious, this review of issues has been selective. Two important omissions deserve emphasis. The first refers to income implications of alternative technique choices. This "loops" back to output-mix question via demand patterns and, in a more dynamic dimension, to incremental capital availability via savings implications. The last feature has received enormous attention in the project evaluation literature, see, for example, Sen [133], UNIDO [158] Little and Mirrlees [89] and Acharya [2]. Stewart and Streeten [146] and Sen [134] provide the best discussions of future employment implications of today's choice of techniques. The second, related, omission concerns the neglect of any discussion of a social welfare function, which is essential for deriving the "shadow prices" of factors, presumably the "target" prices of fiscal/financial intervention. See Sen [134].

A. Technological Substitution Possibilities within a "Sector" or "Product"

The main conclusions here were:

(i) The mountain of work on production function estimates of capital-labor substitution has produced fairly untrustworthy mice. The theoretical and empirical objections to this approach warn against further research investment in this area.

(ii) Detailed micro-studies are a viable alternative. Their close resemblance to project choice questions bring them into a genuine policy crucible, and nudges researchers towards a more realistic understanding and modelling of engineering options.

(iii) The main analytical inconvenience of micro-studies of alternative techniques is their failure to yield summary measures for the scope for capital-labor substitution. This is a corollary of mapping real, as opposed to mathematically convenient, isoquants.

(iv) If micro-studies are to be done systematically with a view to drawing out macro factor employment implications of alternative technique choices in a wide range of "products" or "sectors", special care must be taken to assure consistency of product definition between the output-mix level and technique choice level. For products satisfying domestic demand where marketability is less constrained by quality and homogeneity considerations, compared to exports, a broad definition of product is more appropriate. Sharp product definition tends to squeeze out technique choice.

B. Factor Prices and Output-mix

While variations in output-mix offer considerable potential for altering economy-wide factor proportions, factor price intervention is likely to take a back seat relative to reforms of foreign trade and taxation regimes, mainly because the latter have more predictable effects on relative product profitability and output-mix. Available evidence on the influence of factor prices on output-mix, *ceteris paribus*, is scanty.

C. Producer Response to Factor Prices

Evidence regarding the hypothesis of profit-maximizing responses by private producers to factor prices remains mixed. As a first approximation it would be fair to say that the hypothesis receives considerable support in competitive market situations. But under conditions of monopoly or oligopoly, private

producers are likely to dilute their cost-minimizing behavior with other considerations. In assessing research results in this area it is important to distinguish "inappropriate" technique choices (relative to profit-maximizing ones) due to poor information on available technology from those which reflect motivation other than profit maximization.

D. Fiscal/Financial Intervention

The existing theoretical literature makes too many simplifying assumptions for the derived advice on optimal intervention to be readily accepted in a real-world context. At least three key assumptions of the simple two-factor, two-good neoclassical models, militate severely with reality, demanding modifications:

(i) the assumption of complete capital malleability ("putty-putty"). The response to factor prices of factor demands associated with existing capital stock will be very different from those associated with planned investment ;

(ii) the assumption of extreme factor supply elasticities; it is only when such assumptions are made that tax/subsidy incidence questions can be neatly dealt with. Otherwise questions of shifting and incidence have to be squarely faced. Attempts, to date, to measure labor-tax shifting have used questionable methodologies ;

(iii) most fundamentally, theory has tended to assume unified factor markets (allowing for well-defined distortions such as a minimum wage), though evidence on market fragmentation is considerable. If factor markets are severely fractured, allowing a wide range of factor price relatives to prevail in different markets, fiscal/financial strategies for market unification may be more important than price-intervention in a particular sub-market.

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The Local Government System in Western Nigeria: A Comparative Evaluation of Performance under Civilian and Military Regimes

by

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I. INTRODUCTION

In most countries, local government units are designed to serve as centres of local initiatives for social and economic development, and as agencies for the execution of national government's policies and programmes as well as intermediaries between the population and the government. The composition and general structure of the units vary from country to country and from one type of regime to the other.

Under the British administration in Nigeria, local government units were basically seen as agencies of the national government. The councils were dominated by the traditional rulers with few non-titled nominated members. The undemocratic nature of the local government units was a source of irritation to the emerging nationalists, some of whom saw the traditional rulers as collaborators with the "imperialists". Hence, the struggle for the democratisation of local government became part of the larger struggle for national self-government.

With the introduction of elected government early in the fifties, the new nationalist regime that emerged in Western Nigeria defined the reform of the local government system as an important priority. It saw local government units as fundamental not only to local development but also as "the superstructure on which the regional government is erected" [1]. Therefore in 1952 a local government Act was passed into law. The Act created a three tier type of local government—Rural, District and Divisional councils. Each type of council had a well defined sphere of competence. Traditional rulers' control of the councils was immediately reversed. While there were still provisions for chiefly presence in

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the councils, control passed to the hands of elected representatives. (Only $\frac{1}{4}$ th of the membership were to be nominated.) The Act gave a large measure of autonomy to the local government units within their spheres of competence. The existing central government officials who were like overlords to the councils became advisers.

The enthusiasm of the nationalists to create autonomous participatory local government units was soon found to be misplaced. Not mainly because the local people were not yet ready for that type of experiment but largely because the central government soon conceived of them as agencies of partisan politics. The participatory element soon became a facade when the regional government was injecting its own local supporters to reverse majorities obtained through elections. The power of Advisers correspondingly increased. In addition, the units were too small as to be able to perform their functions effectively. This resulted in most of the councils not being able to deliver the "goods" as agencies of local initiative and development.¹

With the apparent failure of the local government units to meet the aspirations not only of the local communities but also of the central government, there were pressures for reform. When the military took over in January 1966 the various councils in the West were dissolved. Their functions were transferred to officials of the regional government stationed in the various localities. The officials were styled "sole administrators". They were vested with political as well as administrative functions of the existing councils. With the introduction of "Sole Administrator System" the principle of local democratic control was also killed. However, due to many other factors, the sole administrator system was found wanting. In 1972, the State Military Regime modified the system. However the structure that emerged after the reforms should be seen more in terms of a technocratic model than a participatory one. At the moment it is difficult to forecast what will happen to the new system. In any case, the military being a transitory regime does not pretend that it is leaving a permanent local government system. One would therefore assume that the new system is still an experiment. Therefore, at this time of national stock taking it is necessary to assess the relative performance of a participatory (no matter the limitations) and a technocratic non-participatory local government system. It is mainly to this aspect that this paper will address itself.

We are also interested in the effect which the type of regime in the centre has on local government activities. Even though in the last two years of our first period (1964/65) the legitimacy of the regional government was very much in

¹This paper is not strictly a critique of the local government system in the West. Therefore we do not intend to delve too much into this. But the reader may wish to consult T. A. Oyejide[3], which deals with some aspects of this.

dispute, this did not detract from the fact that it was still operating in a highly politicized environment. While it was true that most of the councils were controlled by nominated councillors, such councillors were still natives of the localities served by the councils and as such they were subject to local political pressures. Furthermore the councillors were not just advisers to the officials, they took decisions within their legal competence. In comparison, the system introduced by the military regimes was completely central controlled with little local initiatives. The sole administrators were agents of the regional/state administration whose careers depend exclusively on their principals in the central administration. Under the military, the regional/state governments were composed of handpicked individuals whose careers also depended on the whims of the government rather than the attitudes of their constituents.

Arising from the above, we argue that the local government system in our first period was operating in a political setting whereas the one in the second period was non-political.

Hitherto, we have analysed the nature of dependence on popular support between a civil and a military regime. We want to test the hypothesis that the level of financial support given to local government units is directly related to the type of regime operating in the centre, (civil or military). Secondly, we postulate that due to the presence of local political pressures, local government units are likely to be more effective in the provision of essential local services when operating in a participatory political setting than in a non-participatory setting.

II. DATA

This study uses five years of civilian rule—1961/62 to 1965/66—and five years of military government—1966/67 to 1970/71—as the basis of the comparative evaluation of the performance of local government units in Western Nigeria in terms of the provision of essential local services.

Interpreted broadly, our definition of local services covers all the services normally provided by the local government units—except administration, a service which a local government unit provides for its own staff rather than the whole community. So, we set out to identify local government expenditures on the following: road construction and maintenance; community development activities; hospitals, dispensaries, health centres and maternity homes; education and the judiciary. Secondly, we wanted to examine the fixed structures and personnel at the disposal of the local government units as measured by the following: mileage of roads constructed and maintained, number of bridges constructed, number of road maintenance labourers employed number, of medical/health institutions,

number of medical/health personnel employed, number of educational institutions maintained or partially maintained, number of employees in the school system, number of judicial establishments and number of employees in these establishments. Finally, we wanted to examine the sources of revenue—which would make the provision of services possible—by looking at the amount of state governments' grant to the local government units, amount of taxes collected by the local government units and other revenue. But since we also wanted to relate the support given by the state government in the form of grants to that government's ability, we examined figures on the regional/state government's revenue and expenditure.

We have relied entirely on official publications [5; 6; 7; 8; 9; 10] as sources of data used in this study. Unfortunately, these sources of data imposed some limitation on the scope of the study since some of the data we wanted to use were not available for some or all of the years covered by the study. Hence, the study is restricted to the examination of three broad categories of services—public works, health and education—and even within these categories, we could not find appropriate or adequate data with respect to public works and education personnel. The table in the appendix, which contains all the data that form the empirical basis of this study, shows the limitations indicated above.

We recognise the fact that there are many problems—of omissions, inconsistencies, and inaccuracies—associated with local government statistics in Nigeria. It is even admitted officially that most of the publications do not “pretend to be complete in coverage”, although “effort has been made to cover as wide a ground as possible” [4, p.1]. But, by and large, we agree with another writer who says that:

“The user of (local government official) statistics has the choice of doing without, compiling his own, or using what is available and attempting to reconcile the conflicting information wherever possible. Even with the inaccuracies, however, the statistics provide a relative, and the best available, indication of trends and tendencies” [2, p.484].

III. INDICATORS AND EVALUATION OF PERFORMANCE

We have stressed the important role of local government administration in the provision of essential local services. The indicators with which we intend to evaluate the comparative performance of Western Nigeria's local government system under the two regimes (civilian and military) reflect this point of view. One set of indicators tries to measure the direct performance of the local government system. This set is made up of three broad categories of essential local services and includes the provision of health/medical services, the provision of educational services, and public works in terms of the maintenance of local roads.

But we believe that the performance of a local government system is influenced, to a large extent, by the kind and magnitude of support and aid which the local government units are given by the regional/state government which established them. In other words, local initiative, enthusiasm and willingness to make sacrifices in terms of the provision of essential local services are not independent of the policy of the regional/state government with respect to local administration and autonomy. Hence, we intend to examine first a set of indicators which tries to measure the regional/state government's support for the local government system.

Support from Regional/State Government

Since this study takes the view that regional/state government policy in terms of its support to the local government system is crucial to the performance of the local government system, we will first examine the indicators of regional/state government's ability and support to its local government units. These indicators are set out in Table I.

TABLE I
INDICATORS OF REGIONAL/STATE GOVERNMENT'S ABILITY
AND SUPPORT TO THE LOCAL GOVERNMENT SYSTEM :
1961/62 TO 1965/66 AND 1966/67 TO 1970/71

Items	Average 1961/62-1965/66	Average 1966/67-1970/71	Percentage Change
1. Regional/State Government Grant to Local Government System (pounds)	835,800	457,400	—45.27
2. Regional/State Government Revenue (million pounds)	20.8460	23.7014	13.69
3. Regional/State Government Expenditure (million pounds)	19.8362	23.1526	16.72
4. Ratio of Grants to Revenue	4.00 %	1.93 %	—51.75
5. Ratio of Grants to Expenditure	4.21 %	1.97 %	—53.21

Note : All figures under items 1, 2 and 3 are in current prices.

Source : Appendix.

Before we examine the amount of support which the regional/state government has been giving the local government units over the period covered by this study, it is important for us to note that the support given must be related to the regional/state government's ability. The indicators which we have used to measure this "ability" are items 2 and 3—the regional/state government's average revenue and expenditure—in Table I. These measures show that while average revenue over the 1961/62 to 1965/66 period stood at approximately £21 million, the average revenue over the 1966/67 to 1970/71 period was approximately £24 million. Thus, on the average, the revenue of the regional/state government increased over the two periods by about 13.69%. The second measure of regional/state government's ability (expenditure) shows a similar trend; it rose from approximately £20 million on the average during the first period to an average of roughly £23 million during the second period, again an increase of 16.72%. Clearly, therefore, the ability of the government at the regional/state level was not impaired (as measured by the indicators specified above) by the change of regime.

Now, given the demonstrated improvement in the ability of the regional/state government over the years, one may expect a similar increase in the regional/state government's support for its local government units, assuming that both its policy and commitment to the local government units remained unchanged over the two periods. But an examination of items 1, 4 and 5 in Table I leads to an opposite conclusion. For example, item 1 shows that regional/state government's grant to the local government system (our indicator of support) which averaged £835,800 during the 1961/62-1965/66 period decreased to an average of £457,400 during the second (1966/67-1970/71) period; a decrease of 45.27%.

When the average annual amount of grant (support) is related to our ability indicators (revenue and expenditure), the picture becomes even more striking. For example, item 4 shows that regional/state government's grant as a proportion of its revenue fell from an average of 4% during the first period to a mere 1.93% during the second; while item 5 shows that the grant as a proportion of government expenditure dropped from 4.21% to 1.93% between the first and the second period. Thus, the ratios show decreases of 51.75% and 53.21% respectively.

The clear indication which emerges from this analysis is that, as measured by our indicators of support, the regional/state government was not as committed to or as willing to help its local government units during the 1966/67 to 1970/71 period as it was during the earlier period.

The Performance of the Local Government System

Now, we may try to examine another question: given the support (or lack of support) by the regional/state government, how well were local government

units able to provide essential local services in their various communities? It is possible to argue that a decrease in the amount of support given to local government units by the regional/state government is not necessarily an indication of a decrease in commitment, if it can be shown that the local government units were doing very well on their own. Similarly, one would expect that, given the same level of commitment, regional/state government support should increase when the local government units are not able to sustain themselves. Hence, the question posed above is a crucial one.

In order to evaluate the performance of the local government system taken by itself, we use three sets of indicators; first, we examine what we call physical indicators of performance, then we discuss monetary indicators and round off finally with measures which are a combination of physical and monetary indicators.

A. Physical Measures of Performance

Given the three broad categories of essential local services—health, education and public works—which we identified above, the physical measures are in terms of the average number of local government educational institutions, mileage of local roads maintained, number of medical/health institutions and number of medical/health staff. The relevant figures on these variables are shown in Table II.

TABLE II
PHYSICAL MEASURES OF THE PERFORMANCE OF THE LOCAL
GOVERNMENT SYSTEM : 1961/62 TO 1965/66
AND 1966/67 TO 1970/71

Items	Average 1961/62-1965/66	Average 1966/67-1970/71	Percentage Change
1. No. of Local Govt. Educational Institutions	1,106	998	—9.72
2. Mileage of Roads Maintained	6,287	7,836	24.98
3a. No. of Medical/ Health Institutions	302	311	2.98
3b. No. of Medical/Health Staff	742	905	21.97

Source : Appendix.

An examination of this table gives the impression that, except for the case of item 1—number of local government educational institutions—the local government system performed better during the second period than the first. For, during the latter period, average mileage of road maintained increased by approximately 25 per cent, average number of health institutions increased by about 3 per cent while the average number of health staff shot up by roughly 22 per cent. The only decrease over the previous period was recorded with respect to the average number of educational institutions, and this decrease was less than 10 per cent.

But this interpretation is subject to serious limitations. There are usually some errors associated with raw physical figures where no allowance has been made for quality. Casual observation leads us to believe that when quality is taken into account, the conclusion which a cursory examination of these figures may imply could be negated. Hence, there is a need to examine other indicators of performance.

B. Monetary Measures of Performance

So, we turn next to monetary indicators of performance. Again, this set of measures relates to the same categories of local services covered above. Thus, Table III presents appropriate figures on average local government revenue over the two periods, average expenditure on public works, average expenditure on health services and average expenditure on education.

TABLE III

MONETARY INDICATORS OF LOCAL GOVERNMENT PERFORMANCE: 1961/62 TO 1965/66 AND 1966/67 TO 1970/71

Items	Average 1961/62-1965/66	Average 1966/67-1970/71	Percentage Change
1. Local Govt. Revenue	6,708.8	4,116.2	—38.64
2. Expenditure on Public Works	1,270.0	909.0	—28.43
3. Expenditure on Health Services	665.8	778.4	16.91
4. Expenditure on Education	1,128.4	555.2	—50.80

Note : Figures in columns 2 and 3 are in thousand pounds/current prices.

Source : Appendix.

An examination of Table III reveals the significant point that average local government revenue declined by approximately 39 per cent between the first and the second period. A contributory cause of this steep decline is, of course, the decrease in the average level of grants received from the regional/state government. But even if the level of grant in the second period had remained what it was in the first period, the decrease in local government revenue in the second period would still have been of the order of 31 per cent. A little arithmetic proves this point. If the proportion of state government grant had remained at 4 per cent of state government revenue as in the first period, then state government grant would have been approximately £960,000. This would have increased local government revenue in the second period to £4,618,800. But even then, there would have been a shortfall (as compared to average revenue in the first period) of £2,090,000, which amounts to a decline of 31.15%. Clearly then, the fall in average revenue reflects not only the lack of regional/state government support but also the inability of the local government units themselves to generate the same (not to talk of increased) level of revenue from local sources in the second period which it did in the earlier period.

Given the steep decline in average local government revenue in the 1966/67 to 1970/71 period, it is not surprising—as Table III shows—that average expenditure on public works and that on education fell by 28.43 per cent and 50.80 per cent respectively. It is noteworthy however that average expenditure on health services rose by 16.91 per cent during the second period.

We are more inclined to accept the conclusion (that, in general, the provision of local services declined) implied by the analysis of monetary indicators of performance partly because of the problems which beset the use of physical indicators and partly because monetary measures are likely to be more accurate in view of the rigid system of control and reporting which the state government imposes on the local government units through statutory periodic audits. In any case, the examination of a third set of indicators may yield a firmer conclusion in terms of the comparative performance of the local government system within the two periods of interest.

C. Combined Physical/Monetary Measures of Performance

Our third and final set of performance indicators is a combination of the physical and monetary measures described above. The rationale for the use of this set of indicators is straightforward and we can use a very simple example to illustrate the procedure. Suppose we want to compare the performance of a local government unit in terms of the provision of some services; for instance a well maintained network of roads; over two time-periods. One method is to proceed

by comparing the number of miles of roads maintained (physical indicator) over the two periods—completely disregarding the quality of the roads (or how well they are maintained) or making appropriate allowances for differences in quality. Another method would be to compare the amount of money spent on maintaining the roads (monetary indicator) over the two period—completely disregarding changes in prices (inflation or deflation) and efficiency between the two periods or making adequate adjustment for these changes. A third approach—which yields the combined indicator used in this section—is to deflate money values by quantity (physical) figures and hence derive, for instance, the expenditure per mile of road maintained.

The results derived from the use of this approach are presented in Table IV. The picture which the information presented in this table shows is that of a general decline in the average per unit expenditure incurred in the provision of

TABLE IV
COMBINED PHYSICAL/MONETARY INDICATORS OF LOCAL
GOVERNMENT PERFORMANCE : 1961/62 TO 1965/66 AND
1966/67 TO 1970/71

Items	Average 1961/62-1965/66	Average 1966/67-1970/71	Percentage Change
1. Public Works Expenditure Per Mile of Roads Maintained	200	120	—40.00
2a. Health Expenditure Per Health Staff	898	860	—4.23
2b. Health Expenditure Per Health Institution	2,205	2,503	13.53
3. Education Expenditure Per Educational Institution	1,021	556	—45.50

Note : All figures are in pounds/current prices.

Source : Appendix.

essential local services, except in the case of health services where a 14 per cent increase in per unit expenditure on health institutions is partly offset by a 4 per cent decline in per unit expenditure on health personnel. If one compares Table II with Table IV, one must conclude that even though it is reported that, on the average, the mileage of roads maintained in the second period is greater than that

of the first period, the quality of the roads must have declined rather sharply. Similarly, it is obvious that a net increase of roughly 22 per cent in the number of health personnel could not be matched by a net increase in health services expenditure of only 17 per cent, except the average quality of health personnel declined.

There is, of course, another perfectly valid way of explaining away the kind of net decrease in average per unit expenditure on essential services reported in Table IV. The table shows, for example, that during the 1961/62 to 1965/66 period an average of £200 was spent on the maintenance of each mile of road by the local government units but that this figure fell to £120 during the 1966/67 to 1970/71 period. If it can be established either that the level of efficiency of road maintenance workers increased during the second period so that there could be some savings in per unit expenditure—or that the level of prices (including the wages of road maintenance workers) fell during the second period, then it is possible to claim that the decline in per unit expenditure on these services does not necessarily imply a decline in the quantity and/or quality of services provided. Now, we have no empirical evidence to show that the level of efficiency of the local government employees increased in any significant way, neither have we found any reason to support the view that the average per unit cost of providing local government services fell during the second period as compared to the first. In fact, we would venture to say that prices generally rose and hence that the decline reported in Table IV is most likely to be something of an underestimation of the actual situation. Therefore, we are inclined to conclude that both the level and quality of services provided by the local government system were considerably lower during the 1966/67 to 1970/71 period than during the earlier 1961/62 to 1965/66 period.

IV. CONCLUSION

Our major concern in this paper has been to concentrate on one major aspect of the rationale for the existence of local government units—the performance of local social-welfare and development functions. We do not contest that this is the only rationale for establishing local government units but we are of the view that it is one of the most important.

Because of the various moves going on in the country for new types of local government system, we have attempted in this paper to evaluate the relative performance of two different models—a participatory and a sole administrator (technocratic) system.

Our first hypothesis tried to relate the performance of local government to the type of central government system. Even though we admitted the existence

of doubts on the popular base of the regime during part of the first period, we also contended that despite this, that regime was operating in a highly politicized pressure-laden environment. And because of this, it is most likely for that regime to give more support to local government units than a military regime which is not subject to that type of pressure. From the data presented in this paper, it would appear that this contention is valid. With relatively smaller resources, the civilian regime gave more financial support to local government units than the military. One possible explanation for this may be because the military is a centralized organisation, it believes more in direct involvement in local development instead of relying on the local governments. However, there are no data to support this contention especially if one looks at our Tables III and IV ; on the contrary it would appear that there exists a general decline in local development activities. A possible explanation of this was the civil war in the country. But this caused minimal disruption in the west and indeed as Table I shows it did not affect the volume of government revenue.

We also examined the performance of the local government units independently of state/regional governments financial support; we argued that due to nonparticipation by the local populace, there would be less local pressure and that this in turn would affect both the quality and quantity of services. The data presented here had abundantly validated this proposition. Using a combination of three indicators we found that a non-participatory system seemed to have fared better in terms of physical indicators such as number of miles of roads maintained and number of medical/health institutions. However, when we employ the other two indicators the picture became clearer. In addition to falling central grants, locally generated revenue also fell. This can be accounted for in terms of the types of regime at the centre and the type of local government units themselves. It would appear that the various local government units have not got sufficient support from a military regime which was/is pre-occupied with local maintenance of law and order and therefore felt reluctant to risk tax revolts. Secondly because of the structure of the society, the sole administrator and his staff could not involve the local population and therefore achieve voluntary financial support from that population on the level that the councillors (nominated or elected) would do, especially if one bears in mind that they (the councillors) are indigenes of the localities.

Even though physical indicators put the performance of the sole administrator system ahead of the participatory one, but other indicators revealed the shallowness of this. For example, we provided data (Tables III and IV) to support the contention that the services were badly maintained if maintained at all. We demonstrated that the increased road mileage under the military with less

expenditure per mile on the faces of increasing costs and no demonstrable cost-saving technological device could not have achieved usable roads. Indeed we would go further to suggest that less staff had been employed and therefore the roads were inadequately maintained. This is also the picture that emerged with respect to the educational institutions where the second period marked a general decline in expenditure where we would expect increasing school population.

Finally, if only tentatively, this paper has attempted to answer one fundamental question—which type of local government system performs better in local development activities. We provided data to suggest that a non-participatory system performs worse than a participatory one. We do not deny that there may be other factors not considered by this paper affecting the performance of development cum-welfare services by local government units. We, however, suggest that before we continue arguments on the merits and demerits of participatory and non-participatory models, attention should be focused on such factors.

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Appendix

TABLE I
DATA ON ALL VARIABLES

Items	Period Totals	
	1961/62-1965/66	1966/67-1970/71
1. Local Government Revenue	26835	20581
2. State Government Grant	4179	2287
3. Public Works Expenditure	6350	4545
4. Medical/Health Expenditure	3329	3892
5. Expenditure on Education	5647	2776
6. State Government Revenue	104230	118507
7. State Government Expenditure	99181	115763
8. No. of Local Government Schools	4422*	4990
9. Mileage of Roads Maintained	31435**	39179**
10. No. of Medical/Health Establishments	302	311
11. No. of Medical/Health Personnel	742	905

Notes : 1. All revenue and expended figures are in thousand of pounds/current prices.

2. All figures have been adjusted to take care of boundary changes introduced by the creation of states in 1967. In addition, all figures exclude Akoko and Akure Divisions for which adequate data are not available.
3. The sign* indicates a total for only four years.
4. The sign** indicates the exclusion of Oyo Divisions due to lack of appropriate data.
5. Medical/Health personnel is made up of nurses, midwives and dispensary attendants. Data on number of doctors are sketchy and hence have been ignored.
6. Medical/Health establishments inside dispensaries, health centres and maternity centres.

Sources : [5; 6; 7; 8; 9; 10].

Attitude of Some Elites Towards Introduction of Abortion as a Method of Family Planning in Bangladesh

by

RAFIQUL HUDA CHAUDHURY*

I. INTRODUCTION

Abortion is often considered to be a stronger population policy than the provision of family planning services. However, existing government policies regarding abortion are not usually considered as a direct part of the overall population policy [8]. Notwithstanding government policy, abortion has always been and remains to be a frequently used method of fertility regulation [4]. The recent examples of use of abortion as a method of fertility regulation very effectively can be traced from the experiences of Japan and some countries of Eastern Europe [8]. Keeping in view the role of abortion in effective control of fertility, Potts opines, "No developed country has ever had a substantial decline in the birth rate without a marked recourse to abortion and it is unlikely that any developing country will see demographic changes desired in the coming decades without abortion playing an important role" [10, pp. 288-94]. One may find contrary evidences to the depositions made by Potts but the fact remains that abortion is a very effective method of fertility regulation and hence it deserves attention.

II. PRESENT STUDY

The issue of introduction of abortion as a method of population control did not remain altogether unnoticed in Bangladesh. The First Five Year Plan (1973-78) of the government of the People's Republic of Bangladesh looked into this issue and observed, "Legalization of abortion has been known as probably the best and most effective method for control of population growth. It should

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be seriously considered how this (abortion) method can be adopted to control population growth in Bangladesh" [6, p. 545]. To what extent legalization of abortion would help in arresting the growth of population in Bangladesh depends, among others, upon the demand for abortion in the community in general and among the potential consumers in particular. In the present state of our knowledge, we do not know what is the actual demand for abortion in the country and to what degree legalization of abortion would receive support from the members of the society in general and from the public opinion leaders in particular. To fill in the above vacuum partially, a modest attempt is made in this paper to identify the attitude of a section of Bangalee elites towards introduction of abortion as a method of family planning in Bangladesh.

III. DATA AND STUDY DESIGN

Data

Data for the present study are drawn from a Survey on Family Growth Study of Selected Elites in Bangladesh. Elites in the above survey comprise of once married males and currently living with their wives of the following occupations: (i) Professors and Associate Professors of the faculties of Social Sciences, Liberal Arts, Commerce, Medicine, Engineering, Agriculture and Physical Sciences of all the Universities of Bangladesh. (ii) The senior government officials not below the rank of Joint-Secretary located in the capital city, Dacca. (iii) Senior research scholars of the leading research institutes of Dacca City. (iv) Owners of the private firms of Dacca City. These groups of people are for purposes of this study referred to as elites. Data are collected through mail Structured questionnaire and altogether 550 questionnaires were mailed out and of these 388 Schedules were returned which yielded a response rate of 70.54%. However, the present analysis will be based on a number fewer than these 388 cases, because of non-response to one or more of the questions used as variables in this study. The survey determined the attitude of the elites towards introduction of abortion as a method of family planning in Bangladesh by asking, "Would you recommend abortion as a method of family planning in Bangladesh"? The positive or negative or neutral attitude of the elites towards introduction of abortion as a method of family planning is determined by checking whether they responded to the above question positively, negatively or remained undecided.

Here, we like to focus upon some of the deficiencies of the data: (i) In this study, attitude towards abortion is determined by ascertaining whether a person approves or disapproves abortion as a method of family planning. This measure may not necessarily tap the attitude of a person towards abortion *per se* because there may be some other persons who favour legalization of abortion for reasons

other than family planning. (ii) We have measured the attitude towards abortion as a method of family planning for a section of the elites only and therefore the attitude being expressed here may not necessarily represent the attitude of other elite groups. But the question of representativeness is not a moot issue here. The primary aim of the present study is to partially ascertain what a group of emerging highly educated elites of Bangladesh think about the issue of abortion. (iii) We have noticed that 30 % of the original study population were non-respondents and if the characteristics of the non-respondents are different from the respondents, the results of the study are also likely to be effected. However, we have no *a priori* reason to believe that the respondents and the non-respondents are characteristically different.

Study Design

The present analysis is delimited to discern the attitude of the elites towards introduction of abortion as a method of family planning by age, education, education of wife, education of father, social mobility status, income, residential background and occupation of the respondents. Classifications of attitude towards abortion by these variables are made in view of the assumption that these variables are likely to affect the attitude of an individual [11]. The expected relationship between each of the above variables and attitude towards abortion; and the findings are presented in the following section.

IV. FINDINGS

A. Attitude of the Elites Towards Abortion

Table I presents data on percentage distribution of attitude of the elites towards introduction of abortion as a method of family planning.

TABLE I
PERCENTAGE DISTRIBUTION OF ATTITUDE* OF THE ELITES
TOWARDS INTRODUCTION OF ABORTION AS A METHOD OF
FAMILY PLANNING IN BANGLADESH

N=388

Yes	No	Non-response	Total
55.67	41.49	2.83	100
(216)	(161)	(11)	(388)

*The determining question was "Would you recommend abortion as a family planning method in Bangladesh"?

The table shows that only a simple majority (55.67%) of the elites recommend abortion as a method of family planning while a sizeable minority (41.49%) do not endorse it. This finding of non-endorsement of abortion as a method of family planning from a significant minority who though being educated and well-placed in the society is not completely unexpected in a traditional Muslim Society like that of Bangladesh where abortion is a highly tabooed subject matter. However, one will find that support for abortion as a method of family planning is rather very impressive among the elites when one compares the proportion of supporters (55.67%) among them with the proportion of supporters (43%) on the same item using the same questionnaire among a group of village elites [3]. Though not comparable, yet it will still be interesting to mention here that among a cross-section of 1130 women of Dacca City, the support for legalization of abortion is found to be only 12.92% [2]. We have presented above only the overall attitude of the elites towards abortion. But this conceals the variations by age, education, income, residential background and occupational status of the respondents. We now present data on the attitude of the elites towards introduction of abortion as a method of family planning by each of the above mentioned variables.

B. Relationship between Age and Attitude Towards Abortion

We expect that age would be inversely related to support for abortion. This hypothesis is posited in view of the assumption that keeping other factors constant a person of higher age is likely to cling more to the traditional ideas and views in comparison to a younger person. A person of higher age is likely to imbibe in himself more of traditional values than of a younger person because the former is probably brought up relatively in a more traditional environment which is prohibitive to abortion. Table II presents data on the percentage distribution of the attitude towards abortion as a method of family planning by age.

TABLE II
PERCENTAGE DISTRIBUTION OF ATTITUDE OF THE ELITES TOWARDS INTRODUCTION OF ABORTION AS A METHOD OF FAMILY PLANNING IN BANGLADESH BY AGE OF THE RESPONDENTS

N=388

Age	Yes	No	Non-response
Below 40 n=152	50.65	46.05	3.29
40—<50 n=174	62.07	35.63	2.30
50 and above n=62	50.00	46.77	3.22
Total	55.67	41.49	2.83

It can be observed from Table II that there exists an inverted U-shaped relationship between age and support for abortion as a method of family planning i.e., low in the youngest age-group (less than 40), highest in the middle age-group (40-49) and lowest in the highest age-group (50 and above). The finding of relatively lower support for abortion in the youngest age-group is unexpected from our hypothesised relationship between age and attitude towards abortion. This could be due to the fact that the idea of abortion possibly did not take a firm root in the mind of the youngest age-groups. Moreover, the elites of the youngest age-group are largely (61.18%) drawn from the faculties of Natural Sciences, Medicine and Engineering who have relatively less support for abortion (Table XII) and this could also explain the lower support for abortion in the youngest age group. Therefore, the above findings have only partially supported our hypothesis between age and attitude towards abortion.

C. Relationship between Education and Attitude Towards Abortion

We hypothesise that education would be directly related to support for abortion. The above hypothesis is posited in view of the assumption that education could be considered as a proxy measure of modernization. Education broadens one's outlook and helps one to evaluate a situation more objectively and higher education provides an appropriate environment for a person to be more amenable to accept new ideas such as abortion.

Tables III and IV present data on the percentage distribution of attitude of the elites towards introduction of abortion as a method of family planning by education and age and education, respectively.

TABLE III

PERCENTAGE DISTRIBUTION OF ATTITUDE OF THE ELITES TOWARDS INTRODUCTION OF ABORTION AS A METHOD OF FAMILY PLANNING IN BANGLADESH BY EDUCATION OF THE RESPONDENTS

N=388

Education	Yes	No	Non-response
B.A. n=53	45.28	50.94	3.77
M.A. n=125	62.40	36.80	0.80
Ph.D. n=210	54.28	41.90	3.81
Total	55.67	41.49	2.83

TABLE IV

**PERCENTAGE DISTRIBUTION OF ATTITUDE OF THE ELITES TOWARDS
ABORTION AS A METHOD OF FAMILY PLANNING IN BANGLADESH
BY AGE AND EDUCATION OF THE RESPONDENTS**

N=388*

Age	B.A.			M.A.			Ph.D.		
	Yes	No	n	Yes	No	n	Yes	No	n
Below 40			10	51.02	48.97	50	56.81	43.18	88
40— <50	60.71	39.28	28	76.59	23.40	47	57.89	42.10	95
50 and above			14	59.25	40.75	27	44.45	55.55	18

*The analysis of the present table is based on 376 cases. For the remaining 12 cases, information on at least one of the above variables is missing.

Note : Percentages in the empty cells are not calculated in view of having smaller (less than 10) frequencies.

It can be observed from Table III that at each level of higher education, the support for abortion as a method of family planning is higher than the lowest education category. Similar finding is also observed in studies conducted in India [13]. The above pattern of relationship also holds true at every age-group (Table IV). However, a point should be noted here that the support for abortion as a method of family planning is higher among those who are Master degree holders in comparison to those who are Doctorates, particularly at the higher ages (Table IV). The finding of relatively lower support for abortion among the Doctorates, particularly at the Higher ages in comparison to Master degree holders is in conflict with our expected relationship between education and attitude towards abortion. However, this finding may have resulted from differential wife's and father's educational background of the elites holding Master and Doctorate degrees. Percentage of wives having education upto B.A. level and above of the elites with Master and Doctorate degrees is found to be 50.40% and 44.76%, respectively. Likewise, the percentage of fathers having education upto B.A. level and above of the elites with Master and Doctorate degrees is found to be 34.40% and 31.43%, respectively. The above figures suggest that in our sample elites having an M.A. have higher level of educational environment than the Ph.D. holders and this could explain the difference in support towards abortion between the above two groups.

The findings of lowest and highest endorsement for abortion among the B.A. and M.A. degree holders, respectively may be explained as follows: (i) Two persons

one having a Bachelor degree and the other having a Master degree are expected to have differential exposure to knowledge. In Bangladesh, courses at B.A. level is usually offered in Colleges and courses at M.A. level is offered mostly in the Universities. Scope for broadening one's outlook and exposure to knowledge is much greater in the Universities than in the Colleges at least for a country such as Bangladesh. In other words, it is posited here that a University provides a more appropriate environment for a person to be more amenable to accept new ideas such as abortion than in the more inhibited atmosphere of the Colleges.

(ii) The differential support for abortion between the elites having a B.A. and an M.A. degree may also result from the differential wife's and father's educational background. Percentage of wives having education upto B.A. level and above of the elites with B.A. and M.A. degree is found to be 36% and 50%, respectively. Similarly, percentage of father's having education upto B.A. level and above of the elites with B.A. and M.A. degree is found to be 26.42% and 34.40%, respectively. From the above findings it appears that an elite with M.A. degree has a better educational environment than of an elite having a B.A. degree. We may therefore say that differential exposure to knowledge and differential environment explain the differences in attitude towards abortion between the elites with a B.A. and an M.A. degree.

D. Relationship Between Husband's Attitude Towards Abortion by Wife's and Father's Education

From the preceding discussions (Section C), it appears that one's attitude towards accepting new ideas such as abortion may be also influenced by one's wife's and father's level of education. If this is true, we will expect to find that one's support for abortion will vary positively by one's wife's and father's level of education. Tables V and VI present data on percentage distribution of husband's attitude towards abortion by wife's and father's education.

TABLE V
PERCENTAGE DISTRIBUTION OF ATTITUDE OF THE ELITES TOWARDS
INTRODUCTION OF ABORTION AS A METHOD OF FAMILY
PLANNING IN BANGLADESH BY EDUCATION OF WIFE

N=388

Education of Wife	Yes	No	Non-response
Less than Matrioulate n=79	51.90	45.57	2.53
Matric/Intermediate n=133	57.14	38.34	4.51
B.A. n=73	46.57	52.05	1.36
M.A. and above n=103	63.11	34.95	1.94

TABLE VI

**PERCENTAGE DISTRIBUTION OF ATTITUDE OF THE ELITES TOWARDS
INTRODUCTION OF ABORTION AS A METHOD OF FAMILY
PLANNING IN BANGLADESH BY EDUCATION OF FATHER**

N=388*

Education of Father	Yes	No	Non-response	
Less than Matriculate n=151	50.99	46.35	2.64	
Matric/Intermediate n=112	60.71	35.71	3.57	
B.A. n=89	53.93	42.69	3.37	
	} 57.71		} 38.80	
			} 3.48	
M.A. and above n=34	64.70	35.29		

*In two cases information on father's education was not available.

The findings in Tables V and VI are in the expected direction with the lone exception being observed in the education category of B.A. for both wife and father. In this category the support for abortion is little lower than what is being observed in the immediately preceding lower education category. This sole departure from the trend could be attributed to chance only.

E. Relationship between One's Social Mobility Status and Attitude Towards Abortion

Here social mobility of an elite will be determined by cross-classifying father's education with son's education. We hypothesise that an upwardly mobile educated person would be more prone to accept abortion in comparison to a person who is relatively less educated and also educationally less mobile. The hypothesis is posited in view of the assumption that a maximum upwardly mobile educated person will be in a better position to get rid of traditional values and accept new ideas such as abortion through higher exposure to education in comparison to a person who is less educated and also educationally less mobile. Table VII presents data on percentage distribution of son's attitude towards abortion by father's education.

It can be observed from Table VII that the support for abortion among the respondents who have achieved the highest educational mobility (i.e., those

TABLE VII

**PERCENTAGE DISTRIBUTION OF ATTITUDE OF THE ELITES TOWARDS
INTRODUCTION OF ABORTION AS A METHOD OF FAMILY
PLANNING IN BANGLADESH BY EDUCATION OF
THE RESPONDENTS AND THEIR FATHER**

N=388*

Respondent's Education	Father's Education					
	Less than B.A.			B. A. and above		
	Yes	No	Total	Yes	No	Total
B.A.	41.67 (15)	58.33 (21)	100.00 (36)	53.33 (8)	46.67 (7)	100.00 (15)
M.A./Ph.D.	59.36 (130)	40.64 (89)	100.00 (219)	58.49 (62)	41.51 (44)	100.00 (106)

*The analysis is based on 376 cases. For the remaining 12 cases, information on at least one of the above variables is missing.

Note: The figure in parenthesis refers to sub-sample.

respondents who are now M.A. and/or Ph.D. holders but their father's educational background is less than B.A.) is at least 43% higher than those who are relatively less educated and educationally less mobile (i.e., those respondents who are now B.A. and father's educational background is also less than B.A.). The data therefore support the hypothesis. Acceptance of new ideas such as small family size by the educationally upward mobile persons is also found in other studies [9].

F. Relationship between Income and Attitude Towards Abortion

We hypothesise that income would be positively associated with attitude towards abortion. This hypothesis is based on the assumption that higher income elites are possibly used to maintaining a certain consumption standard and this consumption norms are likely to be threatened if they have more children. Therefore, the elites of higher income group are expected to advocate for more effective methods of fertility regulation such as abortion. Moreover, knowledge and attitude towards family planning and practice of contraception is usually high among the higher income groups. Therefore, one can also expect higher endorsement for abortion among the higher income groups. Table VIII presents data on attitude towards abortion as a method of family planning by income of the respondents.

TABLE VIII

PERCENTAGE DISTRIBUTION OF ATTITUDE OF THE ELITES TOWARDS INTRODUCTION OF ABORTION AS A METHOD OF FAMILY PLANNING IN BANGLADESH BY INCOME OF THE RESPONDENTS

N=388*

Income (Taka)	Yes	No	Total
Less than 1500 n=105	53.33	46.66	100.0
1500—<2000 n=102	57.84	42.15	100.0
2000 and above n=156	61.53	38.46	100.0

*The analysis of the present table is based on 363 cases. For the remaining 25 cases information on at least one of the above variables was not available.

TABLE IX

PERCENTAGE DISTRIBUTION OF ATTITUDE OF THE ELITES TOWARDS ABORTION AS A METHOD OF FAMILY PLANNING IN BANGLADESH BY INCOME AND AGE OF THE RESPONDENTS

N=388*

Age	Income (Taka)								
	Less than 1500			1500—<2000			2000 and above		
	Yes	No	n	Yes	No	n	Yes	No	n
Below 40	51.38	48.61	72	59.52	40.42	47	45.45	54.55	22
40—<50	57.69	42.30	26	64.58	35.41	48	66.29	33.70	89
50 and above			6			7	60.00	40.00	45

*The analysis of the present table is based on 363 cases. For the remaining 25 cases information on at least one of the above variables was not available.

Note : Percentages in the empty cells are not calculated as they contain less than 10 cases.

TABLE X

PERCENTAGE DISTRIBUTION OF THE ATTITUDE OF THE ELITES TOWARDS INTRODUCTION OF ABORTION AS A METHOD OF FAMILY PLANNING IN BANGLADESH BY INCOME AND EDUCATION OF THE RESPONDENTS

N=388*

Education	Income (Taka)								
	Less than 1500			1500 <2000			200 and above		
	Yes	No	n	Yes	No	n	Yes	No	n
B.A.			8			8	54.54	45.45	33
M.A.	50.00	50.00	40	59.26	40.74	27	75.92	24.07	54
Ph. D.	56.14	43.85	57	61.19	38.80	67	53.62	46.37	69

* The analysis of the present table is based on 363 cases. For the remaining 25 cases information on at least one of the above variables was not available.

Notes : Percentages in the empty cells are not calculated as they contain less than 10 cases.

Table VIII shows a positive relationship between income and endorsement for abortion as a method of family planning. Similar finding is also noticed in studies conducted in India [5 ; 13.] The above relationship holds true even when allowance is made for the effect of age and education (Tables IX and X) with two minor exceptions. In the age-group below 40 the support for abortion in the highest income category is not greater than the middle income group (Table IX). This departure from the trend may be due to sampling bias as a very small number of cases are involved here. The other exception is noticed in the highest education category where the support for abortion as a method of family planning in the highest income group is not greater than the middle income group (Table X). This may be due to the fact that in this category a considerable proportion (49.27%) of natural scientists were selected who have relatively less support for abortion as a method of family planning (Table XII).

The greater support for abortion as a method of family planning among the higher income groups may arise out of interaction between their preferred consumption standard and their actual family size. The higher income groups on the average have more than 2.70 children.¹ Any further addition of children may jeopardise their preferred consumption norm and in possible cognizance of the above situation they are now controlling their fertility effectively² and also advocating for a more rigorous measure of fertility control i.e., abortion.

G. Relationship between One's Rural Background and Attitude Towards Abortion

We hypothesise that a person who has spent more of his early life in a village area is likely to retain more of traditional values such as inhibiteness to abortion than a person who has spent less of his early life in a village or he did not spend any part of his life in a village area. The hypothesis is posited in view of the assumption that prevalence of traditional norms and practices is dominant in rural areas and one is likely to retain those practices through the process of socialization if one spends more of his early life time in a village area. We have emphasised more on early life because one's personality formation is tremendously influenced by one's early socialization process. Table XI presents data on percentage distribution of elites attitude towards abortion by residential background.

The findings in Table XI show that the elites who had lived 10 or more years of their early life in village(s) have relatively lesser support for abortion as a method of family planning in comparison to those who had either spent less than 10 years of their early life or never lived in the village(s). Though the above differences are in the expected direction but the differences are very minimal.

¹Average number of Children for low, medium and high income groups is found to be 2.36, 2.71 and 3.42, respectively.

²Percentage distribution of current users of contraception for low, medium and high income groups is found

TABLE XI

**PERCENTAGE DISTRIBUTION OF ATTITUDE OF THE ELITES TOWARDS
ABORTION AS A METHOD OF FAMILY PLANNING IN
BANGLADESH BY VILLAGE BACKGROUND**

N=388

Village Background	Yes	No	Non-response	Total
Never Lived in a Village n=83	57.83	40.98	1.19	100.0
Lived for Less Than 10 Years n=96	58.33	39.58	2.09	100.0
Lived for 10 or More Years n=200	55.00	42.50	2.50	100.0

Note : Category frequencies do not add to total sample because information on village backgrounds for 9 individuals were not available.

H. Elites' Attitude Towards Abortion by Occupational Status

Here, we posit no *a priori* hypothesis. We are only interested to examine the variations in support towards abortion among different occupational groups and offer posthoc explanations for the differences. Table XII presents data on percentage distribution of attitude of the elites towards abortion as a method of family planning by occupational status.

It can be observed from Table XII that the occupational groups are sharply divided on the issue of abortion as a method of family planning. The occupation groups may be ranked from the highest to the lowest on the question of support for abortion as a method of family planning as follows : (i) Senior level government officials 75.30%, (ii) Professors of Social Sciences and Liberal Arts (65.15%), (iii) Natural Scientists (54.74%), (iv) Professors of Commerce (42.85%), (v) Professors of Medicine (32.00%), (vi) Professors of Engineering (20.00%). The above pattern of relationship is maintained even when allowance is made for the effect of education, income, father's education and age. However, control for the above factors did not allow us a meaningful comparison across all the professional groups and particularly, for the Professors of Commerce, Engineering and Medicine as we have relatively smaller number of cases in these groups. The higher support for abortion as a method of family planning among the senior government officials may be attributed to the following reasons : (i) The senior level government officials are disproportionately Master degree holders (40.00%) whom we found to have maximum support for introduction of abortion as a method of family planning

TABLE XII

**PERCENTAGE DISTRIBUTION OF ATTITUDE OF THE ELITES TOWARDS
ABORTION AS A METHOD OF FAMILY PLANNING IN BANGLADESH
BY OCCUPATIONAL STATUS OF THE RESPONDENTS**

N=388

Occupation	Yes	No	Non-response
Professor/Associate Professor of Social Sciences and Arts n=66	65.15%	31.81%	3.03%
Professor/Associate Professor of Commerce n=21	42.85%	57.14%	—
Professor/Associate Professor of Physical Sciences and other Physical Scientists n=137	54.74%	43.06%	2.19%
Professor/Associate Professor of Medical Colleges n=50	32.00%	62.00%	6.00%
Professor/Associate Professor of Engineering University /Colleges n=25	20.00%	72.00%	8.00%
Government Officials n=81	75.30%	24.69%	—
Self-employed (businessmen) n=8	+	+	+

+Percentage is not computed in view of very small n.

(Table II). (ii) These officials are possibly brought up in a more progressive educational environment as evidenced by the fact that 47% of their fathers have education B.A. and above and we have found that support for abortion is higher in

a situation where the respondents and their fathers have higher educational background (Table VI). (iii) High government officials by virtue of their positions and roles in the government are possibly well abreast with the national problems including the population problem of the country. The difference in the endorsement of abortion as a method of family planning between Professors of Social Sciences and Natural Scientists may be due to the following reasons : the subject matter of the Social Scientists are mainly the social problems and issues while the Natural Scientists primarily deal with matter and their exposure to social issues may be just peripheral. This differential degree of exposure to the social issues and problems may have also accounted for the differential endorsement for abortion by the above two professional groups. Similarly, the lower support for abortion among the Professors of Commerce, Engineering and Medicine may also be explained in terms of their lower exposure to the social problems and issues but we refrain from further speculating about the lower support for abortion among the above professional groups as we have fewer observations on them in the present study.

V. SUMMARY

The findings of the present study are briefly summarised as follows :

- i) A simple majority (55.67%) of the elites showed a positive attitude towards introduction of abortion as a method of family planning.
- ii) Elites with higher education are more prone to accept abortion than those with relatively lower education.
- iii) Support for abortion does not show any consistent relationship with age.
- iv) Support for abortion is higher in a situation where wives and fathers of the elites have highest educational background but support for abortion as a method of family planning is usually lower among the elites whose wives and fathers are relatively less educated.
- v) Elites who have achieved the maximum educational mobility are more prone to accept abortion in comparison to those who are relatively less educated and also less mobile.
- vi) Support for abortion vary positively with income.
- vii) Support for abortion is influenced by one's residential background.

- viii) Senior government officials and Professors of Social Sciences tend to support abortion more as a method of family planning in comparison to Professors of Physical Sciences, Commerce, Medical and Engineering Faculties. Engineering and Medical professionals are found to be the most conservative groups in terms of acceptance of abortion as a method of family planning.

The findings presented in this study mostly examines bivariate relationship and hence no causality should be assumed between variables.

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Capacity-utilisation of Deep Tubewell Irrigation in Bangladesh : A Time-Series Analysis of Comilla Thana

by

MAHMUDUL ALAM

I. INTRODUCTION

It is generally known that capacity-utilization of irrigation facilities has not taken place in Bangladesh. This paper endeavours to shed some light on the state of affairs in Deep Tube Well (DTW) irrigation with regard to utilization of installed capacity.

Irrigation is important for bringing about a technological breakthrough in the tradition-bound agriculture of Bangladesh. With a highly unfavourable land-man ratio and little cultivable waste the only way open to the country is to raise productivity (i.e., per acre productivity) of the existing cultivable land. At present, the cropping intensity is around 150%. Land productivity can be increased by increasing cropping intensity and/or by increasing the yield rate of different crops. In the above context, favourable development of irrigation facilities will contribute to land productivity in three main ways.

(1) Firstly, the monsoon-dependent or fed-crops, that are raised now can be supplied with required water in case of drought or irregularities of the precipitation.

(2) Secondly, during the dry winter season another crop can be raised with complete dependence on irrigation.

(3) Thirdly, other agricultural innovations like use of High-Yielding Variety (HYV) seed, chemical fertilizer, scientific weeding etc., can be profitably undertaken with a controlled water supply.

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In Bangladesh, during the last decade favourable policies¹ were pursued to encourage adoption of mechanized (especially low lift pumps and deep tubewells) irrigation among farmers. Acreage under (irrigation-fed) *boro* more than doubled in the period 1965/66 to 1970/71, from 1.13 million to 2.42 million acres. With the above background this paper will concentrate on two main themes :

(1) What is the capacity-utilization rates of DTW irrigation facilities in Bangladesh ?

(2) What are the main factors (economic or non-economic) behind under-utilization (if any) of DTW capacity ?

II. METHODOLOGY AND DATA

In this paper capacity of a DTW is defined as

$C = \frac{TWp}{Gp}$, where C represents capacity of a DTW expressed in terms of irrigable acres in the peak month, TWp represents total water available to the field (net of conveyance losses) from a DTW in a month and Gp is the gross crop water requirement per acre from irrigation in the peak month. Rate of capacity-utilization (U) is defined by $U = B/C \times 100$, where B is the actual area irrigated by a DTW. For a given area in any year, U is estimated by summing B and C over all DTWs in operation.

There are some practical difficulties in defining C. Irrigation water is not required at an uniform rate throughout the crop-season. If we divide the total crop season into some suitable periods we get one or more periods in which the water requirement is the highest in comparison to other periods and such period(s) is (are) called 'peak period' (s). The optimum need for irrigation water in a particular period of any crop is a function of the life cycle of the crop, effective rainfall, and field losses. Hence, the capacity (in terms of irrigable acres) in the 'peak period' will define the capacity of DTWs for the whole crop season. TWp is given by the operational efficiency of DTW assuming uniform conveyance losses throughout the crop season [9]. Gross water requirement in the peak period is given by,

$Gp = \text{Net consumptive need} + \text{water losses in the field through percolation etc.} - \text{effective rainfall.}$

¹Generous subsidies were given on the rental of low-lift pumps, tubewells, price of fertilizer etc. The share of the subsidy on the rental of irrigation facilities ranged between 70 to 85%. The rental is calculated on the basis of market prices. The irrigation equipments are imported at a preferential exchange rate vis-a-vis consumer goods.

The second term on the right-hand side is determined by field efficiency, which is in turn given by the soil-structure.

In this study we take up DTW irrigation in Comilla Kotwali Thana (hereinafter Comilla Thana). We pick Comilla Thana because reliable time-series data relevant for our study are available for the area from the Bangladesh Academy for Rural Development (BARD). The data were generated by the Academy through agricultural sample surveys every year. Qualified graduates supervised the survey work, while enumeration was done by matriculates. In estimating capacity-utilization of DTWs we need data on (a) total capacity discharges of water in *boro* season, (b) actual number of acres irrigated in *boro* season, (c) effective rainfall during *boro* season, (d) field efficiency rate, (e) consumptive water needs of HYV-*boro*, (f) loss of irrigation water between the pumping point and the ultimate irrigated land (channel loss) and (g) 'peak period' for the area. Furthermore, in order to identify the factors responsible for under utilization of DTWs we needed data on availability of agricultural inputs viz., HYV seed, High Speed Diesel (H.S.D.), lubricating oil, spare parts for DTWs, fertilizer, credit from co-operatives and yield rates of HYV-*boro* and input-uses by farmers of different size-groups.

Total capacity discharges of DTWs in *boro* season were obtained from the Comilla Kotwali Thana Central Co-operative Association (KTCCA). KTCCA gave us information on the capacity discharges of each DTW operating in a season. Summing individual capacity discharges of DTWs in a season we derived total capacity discharges for the study area.² Actual number of acres irrigated were also obtained from KTCCA. Effective rainfall during the *boro* season was calculated from [1] using the mean rainfall of twenty years (1945-65). In the absence of any definite knowledge about field efficiency rate we have used three different rates, 50, 60 and 70% respectively.

According to experts of Soil Survey of Bangladesh (SSB), in alluvial Bangladesh field efficiency rate is not expected to be below 50% [3; 5]. We derived consumptive water needs of the crop in Comilla from [5] taking January 1 to May 15 as the crop season. Again in line with the last mentioned study we assumed a 15% channel loss. We divided the crop-season of four and a half months into four and a half periods and obtained the following monthly or periodic consumptive requirements of HYV-*boro* in Comilla.

²The data provided by KTCCA are based on the operational efficiency of a DTW on its first day of operation. It is assumed that the same level of efficiency will be obtained throughout its life time. To the extent that this assumption over-estimates capacity discharge of a DTW, the level of under-utilization will be underestimated. Capacity discharge figures were quoted in cusecs. 'Peak month' supply was obtained by assuming that a DTW is operated for 21 hours a day.

TABLE I
MONTHLY CONSUMPTIVE REQUIREMENT FOR THE
BORO CROP (IN INCHES)

January	February	March	April	May
2.4	3.4	5.2	6.3	3.6

Source : IBRD [5].

Based on Table I we estimated gross monthly water requirements of the crop at 50, 60 and 70% field efficiency rates.

TABLE II
GROSS MONTHLY WATER REQUIREMENT FOR THE BORO CROP
AT 50, 60 AND 70% FIELD EFFICIENCIES (IN INCHES)

Field Efficiencies	January	February	March	April	May
50%	4.8	6.8	10.4	12.6	7.2
60%	4.0	5.6	8.6	10.5	6.0
70%	3.4	4.8	7.4	9.0	5.1

Source : Based on Table I.

Though the *boro* crop is raised in a comparatively dry period, it still benefits from some rainfall. Deducting the amount of effective rainfall we arrive at our estimates of gross monthly water requirements from irrigation.

TABLE III
GROSS MONTHLY WATER REQUIREMENTS FROM IRRIGATION
AT 50, 60 AND 70% FIELD EFFICIENCIES (IN INCHES)

Months					
Field Efficiencies	January	February	March	April	May
50%	4.48	5.58	7.39	6.75	1.02
60%	3.48	4.44	5.64	4.65	—0.18
70%	2.90	3.63	4.41	3.15	—1.04
Effective Rainfall	0.52	1.22	3.01	5.85	6.18

Sources : [1; 5].

Note : At 60% and 70% efficiencies in the month of May, no irrigation is required.

Table III shows that whatever be the assumed field efficiency rate March is the peak requirement period for HYV-boro in Comilla. One assumption is implicit throughout the analysis is that all fields growing boro crop start the same day and hence face the same 'peak month'. In fact, transplanting period and consequently the 'peak month' are not exactly identical for all fields. But the variation is unlikely to affect our results significantly.

No data on the supply of H.S.D., lubricating oil, HYV seed and spare parts for DTW were available. We collected data on the distribution of fertilizer and co-operative credit from the KTCCA. Data on yield rates and input-uses were obtained from [6;7].

A word relating to estimated capacity-utilization rates is in order. We have expressed the area under irrigation in a particular boro season as a percentage of installed capacity. Our installed capacity (irrigable) acres are expressed in standard acres, because we have defined them in terms of optimum irrigation intensity. But the area irrigated figures are not expressed in this 'standard irrigated acres'. Insofar as the irrigated acres are below the optimum intensity the capacity-utilization rates are over-estimates.

III. FINDINGS

Estimates of Capacity and Utilisation Rates

Table IV below shows that the total installed capacity of DTWs has increased every year with the exception of 1965/66. Area irrigated by DTWs increased from 36 acres in 1962/63 to 8910 acres in 1971/72. In the period under study 1970/71 recorded the highest boro acreage under DTW irrigation. According to our estimate of utilization rate the last mentioned year gives the highest level of utilization of DTW irrigation capacity. In the initial years utilization rates were very low e.g., 17, 40 and 35% in 1962/63, 1963/64 and 1964/65 respectively at 50% field efficiency rates. In the seasons following 1964/65, the utilization rate went up. The years 1967/68 and 1971/72 give relatively low figures in comparison to other years during the period 1965/66 to 1970/71. It is however, clear that considerable amount of unutilized DTW irrigation capacity was available throughout 1962/63 to 1971/72. At 50% field efficiency rate the level of under utilization ranged between 38 to 83%. At higher field efficiency rates, much higher figures for under utilization rates were obtained.

TABLE IV
 INSTALLED CAPACITY OF DTW IRRIGATION, AREA IRRIGATED AND
 CAPACITY UTILISATION RATES UNDER DIFFERENT FIELD
 EFFICIENCIES

Boro Season	No. of DTWs	(1) (2)	Capacity in Terms of Total Cusecs Available at the Irrigable Field (3)	Capacity in Terms of Aores(C)			Area Irrigated (B) (in acres)	Capacity Utilization Rates (U) (in per cent)		
				At 50 % Field Efficiency (4)	At 60 % Field Efficiency (5)	At 70 % Field Efficiency (6)		At 50 % Field Efficiency (8)	At 60 % Field Efficiency (9)	At 70 % Field Efficiency (10)
1962/63	2		2.50	211	277	354	36	17	12	10
1963/64	12		12.54	1060	1393	1777	424	40	30	23
1964/65	34		33.29	2813	3695	4417	1006	35	27	22
1965/66	25		25.63	2165	2844	3632	1127	52	39	31
1966/67	46		47.59	4021	5504	6743	2350	58	42	34
1967/68	91		92.33	7802	10249	13083	3892	49	37	29
1968/69	126		128.95	10896	14313	18272	6204	56	43	33
1969/70	168		165.26	13964	18344	23417	8001	57	43	34
1970/71	194		197.51	16689	21924	27989	10351	62	47	36
1971/72	210		204.81	17306	22733	29020	8910	51	39	30

Source : KTCCA.

Factors Responsible for Underutilization DTW Capacity

Theoretically, underutilization of DTW capacity can be attributed to low social and private profitability, demand bottlenecks which can again be related to profitability, inadequate supply of complementary inputs and constraints imposed by social and institutional environments. In the following pages we shall systematically try to find to what extent each of these factors may (or may not) have contributed to under utilization of DTW capacity in our study area.

Whatever limited information are available indicate that DTW irrigation supported by adequate supply of complementary inputs represent a highly profitable investment opportunity in the agriculture sector. In the First Five Year Plan of Bangladesh the social benefit cost ratio (B.C.R) was estimated to be 5.1 [4, p. 150]³. In their calculation the planners used international prices (c.i.f.) for output and input as their shadow prices. In reality inputs are available to the farmers at highly subsidised prices implying that the private profitability of DTW irrigation is even higher. Therefore contrary to our finding straight forward application of B.C.R should have resulted in a much higher level of utilization of DTW capacity and also in a greater rate of expansion of installed capacity. Clearly, one would have to look elsewhere for explaining underutilization of DTW capacity.

Demand for DTW irrigation has grown over the period. *Boro* acreage increased from 1,500 acres in 1963/64 to 13,288 acres in 1971/72. However, more land could have been brought under *boro* cultivation given the availability of installed irrigation capacity and also of land suitable for HYV—*boro* (by substituting *deshi boro* and *aus* land for HYV-*boro*). Presence of unutilized installed DTW capacity and land show that there was an apparent lack of demand for irrigation water. Relevant data are not available to identify the causes for this demand-bottleneck although some limited speculations are feasible.

On the supply side, we expect a positive relation between the availability of HYV seed, fertilizer, co-operative credit, H.S.D. etc., and the level of utilization of DTW capacity. Information on input-availability are not satisfactory. We have some reliable data on co-operative credit and fertilizer. Per acre availability of these items are presented in Table V.

³Estimates by BARD of B.C.R for other competing crops viz., *desi boro* and *aus* indicate lower figures.

TABLE V
PER ACRE AVAILABILITY OF INPUTS

Boro Seasons	Utilization Rates (in%)	Per Boro Acre all Year Credit (in 100 Taka)	Per Acre Boro Credit (in 100 Taka)	Per Acre Fertilizer (in maunds)
	(1)	(2)	(3)	(4)
1962/63	17	100		608
1963/64	40	7. 2		49. 7
1964/65	35	8. 7	69.22	24. 1
1965/66	52	7. 1	60.03	14. 8
1966/67	58	6. 3	74.88	18. 2
1967/68	49	11.10	169.72	12.42
1968/69	56	4. 7	133.03	8.10
1969/70	57	12. 1	107.99	13. 0
1970/71	62	1. 4	63.42	11. 6
1971/72	51	0. 5	36.41	15.49

Source : KTCCA.

Any clear positive correspondence between per acre availability of inputs and the level of utilization of DTW capacity cannot be established from the data presented above. However, an aggregative picture of this type conceals the group-specific situations. We need to know how did the big farmers stand vis-a-vis the small farmers with regard to the availability of inputs. In reality, socio-political and related institutional factors may possibly have played important role in the observed underutilization of DTW capacity in Comilla Thana. For example, in the first two seasons mechanized DTW irrigation in Comilla Thana witnessed considerable resistance from the farmers [2]. Mechanized irrigation was a new phenomenon and many farmers even thought the adoption of mechanized irrigation to be a defiance of God. Low rates of utilization in these initial years can thus be partially explained by age-old taboos and beliefs. Soon, however, prospect of material benefits from DTW irrigation helped farmers to get rid of some of their earlier-held prejudices.

A few words relating to the nature of decision-making in DTW operation are in order to throw some light on the socio-political factors responsible for underutilization of capacity. The DTWs are rented out to the co-operative groups by the Bangladesh Agricultural Development Corporation (BADC) on the recommendation of KTCCA. Members of a co-operative belong to different size groups of farmers but the leadership is usually vested in medium and large farmers [6; 7]. The co-operatives are service co-operatives, dealing in some agricultural inputs. The farmers do not form a cohesive group. A DTW is a capital unit covering some 100 irrigable acres. In constructing the distributory channels each and every farmer must co-operate. Otherwise, in an area of fragmented and subdivided holdings as in Comilla, a far-flung plot cannot benefit from irrigation if the owner of a plot between the pumping point and the ultimate irrigable plot does not agree to join the group.

A farmer in the command area may not join the group either because of factional conflict or because he is a small farmer who is not allowed to obtain irrigation water at terms comparable with those offered to large and the medium farmers. It has also been found that the small farmers in spite of being relatively more productive [6; 7], pay higher than co-operative prices for the agricultural inputs. And in extreme poverty situation their demand may go entirely unfulfilled. Under these circumstances less than optimum utilization of DTW capacity is not unexpected.

IV. CONCLUSION

In case of capital-unit like the one discussed, non-realization of capital takes place due to lack of co-operation within the group which jointly owns it. If one cannot ensure better co-operation within the group under the given socio-economic set up, smaller tubewells irrigating say around 5 to 10 acres should be considered. Due to lack of any information on very vital inputs e.g., H.S.D., lubricating oil, spares and electricity we could not say how they were related to underutilization of DTW capacity.

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Review Article

Education, Manpower and Development in South and Southeast Asia

by

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I. INTRODUCTION

Importance of education in the process of economic development has been recognised by many. However, in spite of the growth of an increasingly large volume of literature on the subject, there does not seem to have been a proper appreciation of some of the basic issues concerning manpower, educational and economic development of a country. The interdependence of these three aspects of development is often ignored, so that the policy prescriptions formulated separately for educational and economic development are sometimes inconsistent with one another and therefore produce undesirable results. Muhammad Shamsul Huq in his latest contribution, *Education, Manpower and Development in South and Southeast Asia* [21] does an admirable job of analysing some of the basic issues in economic and social development of perhaps the poorest region of the world and also by recognising the interdependence between the three aspects of development mentioned above, he has been able to indicate feasible strategies of development which should be seriously considered by the policy-makers in the countries of the region. Such a competent analysis of the problems of development particularly those directly related to education does not come to us as a surprise, given his long experience extending over two decades as a practitioner, thinker, researcher, and also briefly as a policymaker in the field of education.

This book is preceded by a number of other noteworthy contributions in the field [19; 20] by Mr. Huq and here his analysis reaches far beyond the realms of education and touches upon a wide range of issues in the economic and social development of the less developed countries. Although he concentrates his attention on the countries of South and Southeast Asia, much of his analysis is

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applicable to a broader spectrum of countries in the developing regions of Asia, Africa, Latin America and Oceania. Besides, the book is a good example of a combination of review of the literature and some original contribution. As it will be clear from the more detailed discussion presented below, Mr. Huq's book will remain a very important contribution to our understanding of the problems of economic and social development in the countries of South and Southeast Asian region.

The book is divided into eight chapters. In the first two chapters the author presents a general background within the perspective of which he proposes to analyse the problems of economic and social (including, of course, educational) development. In these chapters he speaks about, what he prefers to call 'the crisis in education and development' and 'the roots of the crisis.' Various concept of development and the concept of human capital are discussed in Chapters 3 and 4. Chapter 5 contains a discussion on the alternative approaches to educational planning. This is followed in Chapter 6 by a structural analysis of the people, economy and the society of the South and Southeast Asian region. A comparative analysis of the educational systems in different countries of the region is presented in Chapter 7. The book is concluded in Chapter 8 with a suggested conceptual framework for educational development "...including some suggested changes in the international aid program that would aim it more effectively toward the goal of development" [21, p. viii]. In our discussion which we shall carry out under the same headings used by the author, we shall try to bring into sharper focus some of the interesting and useful observations made by the author and whenever possible, supplement his analysis by further remarks and evidence (references).

II. THE CRISIS IN EDUCATION AND DEVELOPMENT

Mr. Huq opens the discussion by identifying different concepts of demand for education. These are, 'social demand' which "...requires the supply of education to be comparable in quantity, quality and instrumental role to that of the education system in the more developed parts of the world", 'plan demand' which is "...based on economic and social targets in the national plans", 'private demand' which is "...the demand for education of individuals according to their own perception of their needs", and 'market demand' which "...concerns the finished product of the educational system depending on the structure of the labour market and influences educational inputs and outputs only indirectly over a period of time" [21, p.12]. Although there is some problem in the above scheme of conceptualisation of the demand for education, the author correctly

stresses the fact that disequilibrium between demand for and supply of education and inconsistency between different types of demand has been a source of crisis and tension in the developing countries.

The crisis and tension arising from the disequilibrium in the educational system would have been more apparent if the author had taken slightly different view of the demand for and supply of education. For analytic purpose, one should clearly distinguish between two markets, the education market and the labour market [10]. It should be noted that the demand for education is partly derived demand and partly direct demand whilst the demand for various types of labour (skills) is entirely a derived demand. Thus the demand for goods and services by the individuals give rise to certain levels of production, saving, and investment activities in the economy which creates demand for various types of labour and this demand is ultimately transmitted to the education market in the form of demand for various types of educational graduates and dropouts. To this should be added that component of the demand for education which arises from the individual's moral, cultural and aesthetic aspirations. This is what can be termed as pure consumption demand for education which is the direct demand for education for its own sake.

Within the above framework, one can distinguish between two types of demand for education, the 'social demand' which subsumes Mr. Huq's 'social demand' and 'private demand', and the 'economic demand' which will include components from Mr. Huq's 'plan demand' and 'market demand'. This concerns the education market only since in the labour market only the concept of 'economic demand' is relevant. Supply in both markets is a function of a host of factors, e.g., labour (skill) supply is determined by population growth, labour force participation rate, age, composition of the population, supply of different types of educational graduates and dropout, availability of on-the-job training facilities etc., and supply in the educational market is determined by availability of seats in educational institutions, scope for non-formal education, cost of education, income and social status of the buyers, amount of subsidy and finally rate of return to education. The crisis and tension that Mr. Huq is talking about arises from three sources, (a) imbalance between demand and supply in the labour market, (b) imbalance between economic demand and market demand for education and finally, (c) imbalance between social demand for education and supply of education. For South and Southeast Asia (a) above is the most important source of crisis and this should provide the reference point for all suggested framework for manpower and educational development of less developed countries. This is not to suggest that (b) and (c) should be ignored altogether, rather they should be accommodated (in the sense that corrective measures be taken) within the overall

planning framework which will ensure, to begin with, productive utilisation of available manpower and provide a decent standard of living to all, a concern echoed strongly by Mr. Huq.

There is another important reason why proper conceptualisation of the basic issue for discussion is important. This refers to the need for policy formulation. The different components of the labour and education market as elaborated above are influenced to a varying degree by different policy instruments which are available at the disposal of the decision making authority. The matching of the policy instruments with targets is possible only after the dynamics of interaction, among variables operating in the two markets is clearly understood. This becomes particularly relevant if one is considering seriously planning the manpower and educational system of a country. Manpower and educational planning can be defined as the process of preparing a set of decisions for future action pertaining to manpower and education [21, p.356]. Need for such planned development is great for recently emerging developing countries, where the financing and administration of education is largely concentrated in the hand of the state, particularly those related to primary and higher education.¹

We again hasten to add here that we do not intend to take a relatively narrow and technocratic view of educational development. On the contrary we wholeheartedly agree with Mr. Huq when he so correctly emphasizes the new role of education in a transitional society which "... is to change the society by breaking through its crust of outmoded traditions, salvaging its inner values and revitalizing its life impulse with selected values from the modern world; it is to change itself in structure, becoming abundant, efficient and productive and part of the mainstream of the world's growing knowledge" [21, p.3]. In this context he correctly draws our attention to the quantitative and qualitative dimensions of educational development. Need for qualitative change in education arises not only for realising the cultural and social aspirations of the people but also to meet the technocratic productivity requirement implicit in economic demand for labour. Mr. Huq identifies clearly some of the reasons for a distorted pattern of growth of the educational system in the developing countries. In particular he rightly points out our attention to the elitist, rigid and formalistic character of the educational system inherited from the colonial regime. What is more disconcerting is that even after repeated attempts at reform in many countries the basic character of the educational system has remained unchanged. One has only to take a look at the educational system of Bangladesh, where a fourth education commission

¹Data for 1965/66 reveal that in Bangladesh 93% of primary enrolment and 100% of the University enrolment was managed by the public sector [24, p.2].

in 15 years is about to present its final report, to find the truth of the above statement.² Mr. Huq provides an excellent exposition of the forces of resistance from within and strikes a harmonious chord with us when he says, "Of the many paradoxes seen in a society in transition, none are more frustrating than those stemming from the deepseated psychological factors that shaped the habits and attitudes of the people during the period of subjugation. Ruthless criticism of an existing order exists side by side with resistance to change".

Mr. Huq then moves on to two important dimensions of educational development relating to the pattern of financing education and that of disparity in educational opportunity. Unfortunately he does not bring out all the implications of either. Financing educational development is admittedly very closely linked with the over all resource mobilisation and allocation so as to maximize a given social welfare function. As things stand the problem of resource gap will haunt the developing countries for a long time to come and many attempts at planned economic and social development will be frustrated because of this. The real problem is one of competing demand for resources for alternative uses, particularly those which are to satisfy some immediate requirement and those where pay-off involves a longer gestation period. The problem is further aggravated by the fact that the existing flow of foreign resources is not easily substitutable for domestic resources so far as educational expenditure is concerned. One aspect of this is brought out by Mr. Huq in the fact that only a small proportion of the available foreign capital inflow is devoted to education.

As for the disparity in educational opportunity, there is no question that this is a real problem. It is very closely linked with other forms of inequity in our societies. However, the problem here again is one of conceptualization of the phenomenon of inequality in the distribution of educational benefit. The concept is clearly analogous to inequality in the distribution of income and wealth. But while there are well defined criteria in relation to which one can measure the degree of inequality in income and wealth, the situation is not so clear in the case of educational opportunity. In other words there is some confusion as to what constitutes equal educational opportunity with reference to which one may consider constructing indices of inequality of educational opportunity. Mr. Huq does not attempt to clarify this point. Clearly, one cannot seriously talk about formulating policy measures directed towards attainment of equality of educational opportunity unless one is clear as to what one is referring to. Besides, without scientific conceptualization, an anatomy of the phenomenon of inequality in educational opportunity will remain a far cry.

²In pre-March 1971 Pakistan three different commissions were appointed which produced three reports [14, 15; 16] dealing with the problems of education in the country.

OECD conference on "Social Objectives in Educational Planning" [23, p.15] attaches three different meanings to the concept of equality of educational opportunity; (i) 'equal access to non-compulsory education for all youngsters of equivalent measured ability—regardless of sex, race, place of residence, social class or other irrelevant criteria'; (ii) 'equal rates of participation in non-compulsory education by members of all social classes'; (iii) 'equal opportunity to acquire academic ability for youngsters of all social classes'. The emphasis on non-compulsory education is understandable because compulsory education necessarily implies a move towards equality of educational opportunity. The problem however is not resolved here because one still needs to put in some operational content to such expressions as 'equal access', 'equivalent measured ability' and 'equal opportunity' (back to square one), which may not be very easy in the context of a developing society. Only the second definition renders itself to unambiguous interpretation although it would perhaps have made more sense if reference was made to equiproportionate rates of participation with respect to school age group population in which case one could have derived an index of inequality analogous to index of decile inequality in income distribution [7].

A slightly different interpretation of equality of educational opportunity is given by Anderson and Bowman [9, pp. 359-60]. They present the following four variants and indicate that each one of them carry with it a different set of policy conclusions. (a) 'An equal amount of education for everyone'. (b) 'Education sufficient to bring every child to a given standard'. (c) 'Education sufficient to permit each person to reach his potential'. (d) 'Continued opportunities for schooling so long as gains in learning per input of teaching match some agreed norm'. Clearly the first concept is impracticable in terms of implementation while the others require elaborate operational content. Such difficulties notwithstanding, it is now apparent that the concept of equality of educational opportunity should contain a quantitative and a qualitative dimension. The quantitative dimension should refer to proportional representation on the basis of number while the qualitative dimension should refer to equal access after the prospective candidates have been normalized for differential socio-economic environment.

Discussions in the literature and by Mr. Huq point out a number of manifestations of inequity in the distribution of educational facilities. (a) In general, in secondary and higher education the student participation rate from higher social strata is greater than that from lower social strata. The narrowing of this gap seems to be a very slow process as seen from the experience of even a country like the U. S. (b) Dropout rate is higher among students from economically disadvantaged class as compared with other classes. (c) Selective schooling system seems

to favour upper income groups compared with lower income group. (d) For all comparable age groups and educational levels, dropout rate is higher and student participation rate is lower in rural areas as compared with urban areas. (e) At all levels of schooling, female participation rate is much lower than male participation rate. (f) Per student facilities (teachers, building space, equipment and other resources) are better in urban areas as compared with rural areas and in government and private grammar schools as compared with other private schools within the same area. While many have shown concern with these apparent manifestations of inequality of educational opportunity, very little has been done by way of suggesting realistic policies for correcting the imbalances. Someone with Mr. Huq's experience could have provided invaluable insight into the problem with suggested remedies but it is unfortunate that he decided to present only a low key treatment of the subject.

In the rest of the chapter Mr. Huq presents a catalogue of a number of other issues related to his view of crisis in education and development. He comes back to some of these issues (e.g., wastage in education) in later chapters so that we shall then have occasion to comment on them at length.

III. THE ROOTS OF THE CRISIS

In Chapter 2 Mr. Huq traces the roots of the crisis to the pattern of growth in developing countries. He presents a brief but pointed analysis of what he calls the contrasting scenes of development in poor and industrialized countries. In particular he draws attention to "... the fallacy of borrowing capital intensive growth models from the industrialized countries for use in societies in which capital is scarce and labour abundant, and in which the prevailing social stratification rule out the free interplay of market forces..." [21, p. 25]. He then analyses the growth of the overall economy and of individual sectors in different regions. He rightly points out that the otherwise impressive growth of the overall economy has been largely neutralized by growth of population particularly in South Asia where the rate of growth of per capita GDP barely exceeded 2 per cent in the latter half of the 1960's.

The author points out the problems associated with the strategy of import substituting industrialisation policy pursued in various countries but sounds very optimistic about the potential of the 'green revolution' in agriculture and adoption of labour intensive techniques in infrastructural activities particularly in road construction. What needs to be stressed here is that neither is 'green revolution' an unmixed blessing nor is there unlimited possibility of labour absorption in road construction. While we shall all prefer a pattern of industrial and infrastructural

development that would ensure a larger utilisation of the labour force, the very continuing small size of these sectors in the economy of a large number of countries in South and Southeast Asia rules out the possibility that they will provide a significant relief for the staggering magnitude of the open unemployment problem in the developing countries. However, the point about distorted factor prices leading towards growth of inefficient industries is well taken. Such cases have been extensively documented in the literature. For employment generation, Mr. Huq could have suggested the possibility of developing agro-based rural industries. This is a dimension that needs to be carefully explored by the development planners. However, the most important missing link in this part of Mr. Huq's analysis remains the implication of the sectoral and overall growth pattern of these economies for their educational development in the past and the possible lessons they contain for the future. In other words the interdependence between economic and educational development is not explored in the historical context.

The declining share in the post war exports has been a matter of great concern for the developing countries particularly for those who have either suffered an absolute decline in their staple export or an adverse movement in the terms of trade. There is no doubt that the causes of the above trend need to be thoroughly investigated for individual countries in order to determine its implication for future growth potential and required structural changes of the economy both of which will significantly influence the path of educational and manpower development by way of their effect on demand and supply in both educational and labour markets.

A related issue discussed by Mr. Huq is the inflow of foreign aid to developing countries which served to bridge the saving—investment and/or export/import gap as the case may be. In this context the following points not all of which are adequately stressed by Mr. Huq, should be noted. (a) Impact of foreign aid on saving investment and income growth is debatable. Here again one can refer to a large volume of literature which present alternative view points [6]. (b) The increasing importance of foreign private investment should be viewed with concern. This is leading towards the growth of multinational corporations and serves to sustain the emerging vested interests and comprador elements in the recipient countries. This will tend to perpetuate various forms of inequity and structural imbalance in the economy with serious consequences for manpower and educational development. (c) For many countries debt servicing burden has turned out to be a significant liability much earlier than one had anticipated. What is most disconcerting is the complete lack of correspondence between debt servicing burden and long run productivity of foreign aid. (d) Finally, a point duly noted by the author, the insensitivity of foreign aid to the need for

educational development has undoubtedly important implications for the much cherished objective of almost all the developing countries to reach the path of self-reliant social and economic development within a reasonable period of time.

The author then comes back to the problem of population explosion and unemployment and makes some useful observations. He correctly points out the implication of population explosion which is being experienced by a number of countries for the need for demographic investment [26] which nations must undertake in order to stay where they are in terms of levels of living. A high population growth in resource poor countries will of course, breed unemployment problems unless it is faced boldly and an imaginative approach is devised to solve it. No country in the region can claim such honour. Mr. Huq draws our attention to more important fact that even an effective family planning technique is unlikely to make much of a dent on the growth of labour force in the near future since "... nearly 50 per cent of the total population of the developing world is under 15 years of age" [21, p. 40]. The situation has by no means been helped by the adoption of capital intensive techniques and also lack of adequate emphasis on an integrated approach towards rural development. Furthermore, the problem of educated unemployed has been plaguing many countries, India being a notable example. In their present form they provide extreme example of imbalance between economic demand and supply in the labour and education market.

There are a number of other issues to which the author has paid only inadequate attention. These are related to the problem of income inequality and poverty and the character of the political power structure in the developing countries. One would have thought that in a book of this nature these two dimensions would have formed the central theme around which the spectre of crisis and tension could have been built and this would have been immensely useful for explaining the pattern of educational development in the countries of South and South-east Asia. The author for reasons which are not very clear to us, did not follow this path of analysis and as such it is not surprising that he failed to establish a clear link between economic and educational development in the historical development of the region although time and again he has mentioned the inadequacy of growthmanship in the context of economic and social development, and lashed out against the existing inequities in these societies.

IV. THE DYNAMICS OF DEVELOPMENT AND EDUCATION

Mr. Huq comes out heavily in favour of moving away from the traditional narrow definitions of development which emphasized growth of GNP and proposes to widen it so as to include other elements some of which are "... (1) a minimum

standard of living consistent with human dignity; (2) sustained improvement in the well-being of the individual; (3) sharing of benefits by all; (4) more equitable distribution of income and wealth; (5) a greater degree of income security; (6) expansion and improvement of education, health, nutrition, housing and social welfare; and (7) the safeguarding of the environment" [21, p. 47]. He would also include in the concept of development elements that are related to the quality of life and which do not lend themselves easily to quantitative measurement and in this context he finds a stronger role for education, "... freedom, equality, human dignity, and social justice raise important issues related to quality of life. Only a part of quality of life is dependent on economic growth, in other words; the rest of it encompasses the vast area of human and social development which education through the ages has tried to explore and serve.... As a matter of fact, quality of life is central to the very concept of education, since education is a process of qualitative change which develops those specific innate qualities that enable an individual to lead a full and productive life as a person, a worker, and a member of a family and a society" [21, pp. 53-54]. From this very naturally follows his assertion that education must serve both social and economic ends and that "The problem lies in designing a system of education articulated by elements of both in the right proportion" [21, p. 54].

He correctly takes the plan models to task for using growth rates as a yardstick for evaluating plan performance but does not provide any content to the concept of "net economic welfare" that he advocates as a criterion for measuring real economic growth. It is clear that all the elements mentioned above could not possibly be combined into a single index so as to make intertemporal and spatial comparisons of social welfare possible. The most that one can do is to pick up a few strategic elements on which quantitative measures are available directly or by proxy and combine them into a composite index using some rational system of weighting. The present author and a number of others have done some exploratory work in this direction [8; 28]. As for the other elements of development one can superimpose them as constraints on the planning framework. Admittedly, the non-measurable pure quantitative dimension would have to rest on the judgement of the decision makers and also of the participants assuming that the policies are formulated within a participatory democratic framework. Here we touch upon very delicate ground given the fact that the extent to which the potential for development (economic, manpower and educational) can be realised depends largely on the political, ideological and institutional framework. Mr. Huq appears non-committal on this vital issue. However, one can not but be impressed with his concern for social justice. He argues very convincingly that a more egalitarian distribution of income and wealth need not be inimical to the growth of income, saving and investment in the developing countries.

Mr. Huq provides an excellent synthesis of the economists' approach to development on the one hand and psychologists' and sociologists' approach on the other and observes that convergence "... in their analysis can be seen in the stress laid on technological change accompanying increasing application of scientific knowledge and a greater division of labour, with more individuals concentrating on more specific tasks with increasingly specialized knowledge so that the tasks are better done". He, however, correctly points out that the historical process leading towards modernization (so called ?) of developing countries cannot be expected to follow the same course as in developed countries. Therefore, one can no longer rely on the prospect of the poor countries reaching anywhere near the living standard of rich countries with the help of imported science, technology and resources from the latter. In this context it would have been worthwhile to go a step further and stress the fact that the ills of the present day developing countries are the product of a historical process of exploitation by colonialism accompanied by feudalism and followed by emerging capitalism and the process being continued in the post-independence era through remnants of feudalism, semi-colonialism and the ever spreading influence of world capitalism.

V. HUMAN CAPITAL AND EDUCATION

Contrary to popular belief, it is now recognized that education has both a consumption and investment component. Studies have revealed that a large part of the income growth in the past years can be explained only in terms of the contribution of human capital which is accumulated through investment in education. Conventional definitions of capital and labour have been found inadequate to explain growth. Mr. Huq presents a competent review of findings from a number of developed countries. Particularly revealing are the findings from the USSR based on micro level data. The positive association between education (so general education) and productivity comes out very clearly.

However, Mr. Huq does not clearly indicate the relevance of the above findings for developing countries although one would like to predict a similar outcome. In point of fact, in some western economies which are relatively under-developed, the contribution of education to the process of growth does not appear to be very promising. For example, Bowles [12] found for Greece, that increasing educational level of the labour force did not contribute significantly to the observed rate of growth. On the other hand, from a cross country analysis, S.K. Sing [29], concludes that the elasticity of output with respect to education is very high (often near one) in the case of developed countries. So, an increase in the amount of education of the labour force, as a whole, would be contributing significantly to the growth of output. In the case of developing countries, however,

this conclusion can not be generally drawn. Clearly, at the present state of our knowledge the issue is far from resolved. Here a few remarks on the underlying methodology for investigating the relationship between education and growth are in order. We shall concentrate our attention on aggregate production functions some variant of which, as clearly indicated by Mr. Huq, form the basis of a large number of studies.

(1) It was pointed out by the present author [2], that aggregate production function analysis should better be carried out within an optimizing framework. This was not attempted by any author using this technique to study the contribution of education to economic growth. Therefore, these conclusions were devoid of any normative implication. Such a shortcoming of what is otherwise known as the residual method was also pointed out by Sen [27].

(2) Measuring the contribution of education through aggregate production function should normally involve the introduction of education as an independent variable in the generalized production function, $Q=f(K,L,E)$, where Q , K , L , and E represent output, capital, labour and education respectively. A number of studies do not consider education as an independent variable and instead incorporate it only as it is embodied in labour [12; 13]. This requires deriving index of labour corrected for quality, a task not always very satisfactorily accomplished. Equally important is the problem of deriving an index of education. For cross country analysis the most commonly used index is the one proposed by Harbison and Meyers [18] but there are also serious problems associated with it [4].

(3) Grilliches [17] suggest that education can be inserted as an independent factor of production and that the least square estimate of the coefficient associated with it will be of a magnitude similar to that of labour. However, Welch [31] points out that this procedure may understate the role of education if one does not take account of both the "worker effect" and the "allocative effect" which refer to better allocative ability (due to education) with respect to other inputs. In order to include both, one has to estimate the value added production function. In any case, the basic problem with the application of aggregate production function analysis seems to be that the intermediate step that is the process of formation of skills [2] is by passed altogether.

VI. EDUCATIONAL PLANNING : APPROACHES TO DIFFERENT MODELS

Mr. Huq discusses at length some of the alternative approaches to educational and manpower planning and as expected casts doubt about their applicability to situations prevailing in developing countries. However, discussion

should have been more sharply focussed around some basic criteria. (a) How far are the underlying assumptions of the different approaches realistic for countries of South and Southeast Asia ? (b) What are the questions that can be answered by the alternative methods ? How important are these questions for the region concerned ? (c) Can the policy measures suggested by different methods be easily implemented ? (d) What are the data requirements and are they easily met in these countries ? While Mr. Huq explores some of these questions he ignores a number of important dimensions. Besides he is not very clear as to what one should do in view of the inadequacies of the available techniques except perhaps carrying on further research, need for which is appreciated by all.

In the literature, the tendency has been to compare different planning methods without any particular reference to the context and conclude in favour of one of them. Alternatively, Blaug [11] asserts that it may be useful to consider certain methods of educational planning as complimentary rather than competitive. But neither of the above approaches puts the role of educational planning techniques in its proper perspective. Given the criteria (a) to (d) above it is not possible for more than one method of educational planning, to be suitable for a particular situation. The approaches differ from one another in very fundamental way and applicability of each depends on the actual state of the world. Any attempt to combine different methods without suitably modifying the underlying assumptions is likely to be illegitimate.

While discussing educational planning techniques there is a need to focus on the relationship between economic planning on the one hand, and 'social planning' on the other. The former would ensure balance between economic demand and supply in the education and labour market and the latter between social demand and supply in the education market. The combination of the two plans will constitute a comprehensive plan which will provide for training and gainful employment of the available labour force and also meet the social, cultural and political aspirations of the people [4]. Clearly, none of the available planning techniques meet such demanding criterion. Besides the existing techniques suffer from a number of other important shortcomings which have not been sufficiently stressed by Mr. Huq.

(1) Relatively more popular approaches do not lend themselves to optimization analysis except that internal rate of return version render itself to a kind of semi-optimization procedure.

(2) Most of the approaches are either vague or make extreme assumptions regarding processes involving production of skill and educational output.

It should be recognised that for analytic purpose, a clear conception of the nature and characteristics of technical, skill and educational production function. While a lot of work has been done on the first, our understanding of the other two remains incomplete [3]. Admittedly, the most perplexing is of course, the conceptualization of the educational production function.

(3) None of the approaches discussed by Mr. Huq directly takes account of the interdependence between manpower, educational and economic development. If one understood Mr. Huq correctly than a proper analysis should have been presented of the general equilibrium approach which treats manpower, educational and economic variables as endogenous to the system. Some examples of this approach can be found in [1;5].

(4) Whatever approach is adopted to suit a particular situation, a number of important questions remain unanswered. (i) Alternative approaches fail to take note of risk and uncertainty associated with manpower and educational planning which necessarily involves a long gestation period. (ii) Methods are not clear about the adjustment mechanism in response to major socio-political and structural changes. (iii) None of the methods provides for evaluation of the consumption component of education. (iv) Questions about distributional considerations are altogether ignored.

What needs to be emphasized here and Mr. Huq recognizes it as well, is that planning of any type cannot be a once for all exercise. Given the restrictive nature of the underlying analytic framework and the ever changing state of the world which define the feasible set of operations, planning exercises should represent iterative process. In Mr. Huq's own words, "Educational Planning should therefore be regarded as a continuous decision making process, rather than a single exercise. Additional information as it becomes available should be used for feedback to the plan in reestimating and resolving plan model from year to year, provided, of course, that the rate of acceleration envisaged in the plan is not too rapid" [21, p.94]. The present author has suggested elsewhere a flexible generalized planning framework which takes explicit note of the iterative nature of the problem and its solution [4].

VII. THE SOUTH AND SOUTHEAST ASIA SCENE

A vivid and sharply focussed picture of the South and Southeast Asian region is presented by the author in Chapter 6. Although some of the issues had already been raised in Chapters 1 and 2, the focuss has been narrowed

down here to a particular region. His lucid analysis makes it clear that the magnitude of the planning problem facing this region is enormous and a very bold approach will be necessary if one were to even scratch the surface. The countries of this region are characterized by a high rate of population growth and a high proportion of dependent population. It is heartening that most of the countries of the region are undertaking determined family planning drive although in a low income slowly growing traditional society with deep rooted cultural and religious values (including subservient role of women) the effectiveness of formal family planning techniques is open to question.

Asian countries are characterized by a low level of educational input into different occupational categories. One can hardly disagree with Mr. Huq's contention that there is little one can expect from the existing plans which do not put enough emphasis on educating the adult employed who are uneducated. This actually raised the rather complicated issue of the relationship between education and productivity in different occupations. This issue is involved and quite understandably Mr. Huq did not try to draw any definitive conclusion although it came up for discussion in several places in the book. The present author has suggested an approach within the neoclassical framework to study the relationship between education and productivity [2]. But there are some problems in applying such analysis to situations in developing countries.

Distortion in the growth pattern of most of the countries is reflected in the fact that while agriculture still accounts for a large proportion of GNP its share in total investment is small relative to other sectors. Furthermore importance of education in agricultural growth has not been recognized at all which is reflected in the state of available educational facilities in rural areas and also in the fact that by far the majority of the uneducated adult manpower originate in the rural areas.

The spectre of poverty and income disparity in the countries of the region is alarming [7]. Most of the countries seem to have experienced a fall in real wages and rise in unemployment. In certain cases this has happened even in areas that have experienced the green revolution. In this context it is unfortunate that the planners have lost touch with the fact that inequality of income and wealth and inequality of educational opportunity are closely related. What is very crucial is to understand the role of educational development in the context of rural development under a regime of new agricultural technology. There is little doubt that unless properly harnessed, the new agricultural technology can aggravate the underlying crisis in the economic, manpower and educational development of the countries of the region.

VIII. EDUCATIONAL SYSTEMS IN SOUTH AND SOUTHEAST ASIA

Mr. Huq is perhaps at his best in this and the concluding chapter where he reviews the existing educational system in the region and comes forward with an innovative framework for educational development. Among others, Mr. Huq draws our attention to the most menacing problem facing the developing countries of the region which is the wastage in education. He conceptualizes wastage in education in terms of 'dropouts' and 'repeaters' and also adds to it a qualitative dimension "...represented by the degree of retardation in intellectual and educational development due to an unfavourable environment within or outside the school, or in other words by the difference between the potential for educational development and the actual development" [21, p. 143].

Now, it is necessary to obtain a measure of wastage in education, an issue not sufficiently explained by Mr. Huq. A generalized concept of wastage in education is proposed by Nagashwara Rao and Tikkiwal [25]. They define wastage in education by $W_0 = (Y + Z + V) / (X_1 + X_2 + Y + Z)^3$. A.R. Kamat [22] proposes a sample estimate w_0 as an estimate of the corresponding population estimate W_0 and shows that under certain conditions the expectation of w is approximately equal to W for large samples, and its variance can be calculated. A number of problems associated with measurement of the components of wastage are pointed out by Kamat.

Some interesting results emerge from an examination of the zero order correlation between a number of indicators. These are presented in Table I. Mr. Huq himself makes a few casual observations from series of cross-country data. We use his data and supplement them with others from [30] to estimate correlation coefficients so that the direction and degree of association between different indicators could be studied. No attempt, however, is made to establish causal relationships. While the magnitude and sign of some correlation coefficients conform to the observations made by Mr. Huq, others do not. Besides some additional observations can be made from Table I.

-
- ³ X_1 — Number of fruitful years in the case of successful students;
 - X_2 — the number of fruitful years in the case of delayed students;
 - Y — the number of unfruitful or additional years spent in the course by the delayed successful students;
 - Z — the number of years spent in the course by students who are unable to complete the course; and
 - V — the number of successful and delayed successful students where knowledge is not utilized in their jobs.

TABLE I

ZERO ORDER CORRELATION BETWEEN SELECTED INDICATORS

	Density	Rate of Growth of Population	GDP Per Capita	Rate of Growth of GDP	Rate of Growth of GDP Per Capita	Ratio En- rolment to Total Popu- lation	Ratio of First Level Enrolment to Age Group	Percentage of First Grade Retained	Student- Teacher Ratio at First Level	Literacy
1	2	3	4	5	6	7	8	9	10	
1.	1.0000	0.1265	0.3148	0.3892	0.3505	0.4131	0.1410	0.5205	0.0988	0.0292
2.	1.0000	0.6715**	0.6320**	0.6307**	0.0067	0.0067	0.1587	0.2464	0.1474	0.3766
3.	1.0000	1.0000	0.9430*	0.9621*	0.4974	0.3811	0.3811	0.6996*	-0.5204	0.4886
4.	1.0000	1.0000	1.0000	0.1009	0.0483	0.0368	0.0368	0.0695	-0.0508	0.0392
5.	1.0000	1.0000	1.0000	1.0000	0.4647	0.3836	0.3836	0.6787**	-0.4902	0.4273
6.	1.0000	1.0000	1.0000	1.0000	1.0000	0.7862*	0.7862*	0.7760*	-0.4496	0.5212
7.	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.5056	-0.1611	0.6703**
8.	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	-0.3698	0.2112
9.	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	-0.2139
10.	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

*and **indicate significance at 1% and 5% level respectively.

Source : [21, p. 147 ; 30].

The correlation coefficient between literacy and percentage of first grade retained is positive but not significant. Therefore, Mr. Huq's statement regarding a close link between wastage and illiteracy should be treated with caution. The most important to note, as also correctly done by Mr. Huq is the significant correlation between percentage of first grade retained and GDP per capita, rate of growth of GDP per capita and ratio of enrolment to total population. What is quite interesting to point out is that contrary to popular belief the inverse relationship between student/teacher ratio and retention rate is rather weak. In fact, it is rather surprising that student/teacher ratio does not have a significant correlation with any one of the variables concerned except that its relationship with GDP per capita is inverse and significant at a relatively low level. What really emerges from this discussion is that not much useful inference can be drawn from correlation analysis on the basis of cross-country data. In particular very careful research is necessary in order to identify the factors influencing wastage in education. In this context considerable attention has been paid to determine the relationship between the rate of retention and the rate of investment in teacher and technology inputs. Preliminary exercises on the basis of assumed relationship have revealed that it is highly desirable to make investment in such facilities as would reduce dropout rate rather than in creating additional absorptive capacity [5]. Mr. Huq is deeply concerned about, and we fully share this sentiment, the problem of growing volume of an adult labour force that lacks basic education needed for learning occupational skills. Therefore, he feels that the major thrust of any strategy to deal with the problem of wastage in education should be towards influencing the educational level of the existing labour force.

This is where we feel we should conclude our observations on Mr. Huq's book. There is little we can add to what he has to say on plan strategies for educational development. As a final note we should add that although we have been critical about a few things, this should not be taken as a reflection on the basic merit of the book which is to raise a number of important issues which should be very close to the heart of those who will be concerned with planning for manpower, economic and educational development of countries in South and Southeast Asia.

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Book Review

Illegal Transactions in International Trade: Theory and Measurement, Edited by Jagadish N. Bhagwati; North Holland Publishing Co., 1974: 208 pages.

The book is a conglomeration of fourteen articles, which are either extensions of the general equilibrium theory of international trade (to include illicit activity in foreign trade) or exercises in techniques to estimate illegal external trade. It is divided into four main parts exclusive of a small last part on miscellany.

The first part consists of three main articles and a brief mathematical proof. The theme in this part is to build a simple analytic framework to incorporate illicit trade practice into the general equilibrium theory of international trade. The familiar two country, two commodity model is used and the task accomplished with distinction. The second part consisting of two articles, is an extension of the analysis to the trade policy area. The third part, with four articles attempts to detect faked invoicing and to arrive at orders of magnitudes of these malpractices. The fourth part is an attempt at estimating smuggling. The three articles here make use of sophisticated statistical techniques to evaluate this problem. The last part is an article on the use of unit values vis-a-vis prices of such a diverse group as machinery exports in international trade. To the entire less developed world the book has a general significance and to Bangladesh a special one. It is assumed that L.D.C.'s and Bangladesh in particular is emersed in the malice of smuggling and faked foreign trade declarations. These have a serious impact on the terms of trade and the balance of payments. Trade policy might have to be drastically re-considered in the presence of these activities. In taking account of these activities from a high theoretical plane and by empirical investigation, the book becomes an asset specially for the L.D.C. trade theorists and practitioners.

In the first part entitled: The Pure Theory of International Trade; the first article is written by J.N. Bhagwati and B. Hansen. With the use of standard geometrio tools of general equilibrium theory smuggling and faked invoicing is analysed, under monopoly and perfect competition, each of these market structures again being characterised by increasing and constant cost. The standard belief that smuggling improves economic welfare because it evades tariffs and taxes (i.e., a movement from restricted trade towards free trade) is disproved in

each of the cases mentioned above. The ethical standards of society that smuggling is bad is upheld by the principles of economic logic ! The second article by Bhagwati and T.N. Srinivasan is a mathematical formulation of the same Bhagwati Hansen conclusions. The third article again by Bhagwati and Srinivasan, use the same analytic framework of Bhagwati-Hansen and extend the analysis to include some other important policy issues of international trade. The focus here is on tariffs and revenue in the presence and absence of smuggling, and optimal trade policy being the objective in either case. The last article is by H.G. Johnson who like the previous authors uses the two country, two commodity model to analyse the welfare effects of smuggling. An interesting analogy is drawn between the theory of optimal tariff retaliation and the case of a country with smuggling, where the government imposes theoretical optimum tariff and the smugglers retaliate by smuggling.

The second part, is entitled : Balance of Payments and Developmental Effects. The two articles in this part are by G.C. Winston and N.J. Bhagwati respectively. The first discusses the over-invoicing of capital goods in Pakistan and its impact on the choice of technique in industry. A measurement of these effects is also attempted. In the second article, Bhagwati discusses how fiscal policies in the trade sector i.e., export and import duties and/or subsidies can lead to dishonest customs declaration because of positive incentives created by such policies. These in turn seriously affect the balance of payments situation. The article is based on the Indian experience.

The third part is entitled : On the Accuracy of Economic Observation : Foreign Trade Statistics. The first article by Oskar Morgenstern is concerned with the accuracy of trade data which he finds of relatively very poor quality. A serious dilemma arises in that the modern sophisticated international trade theory cannot be substantiated with these data. He laments the use of these data for policy purposes in the absence of a better alternative. The second article by S. Naya and Morgan scrutinizes the foreign trade statistics of L.D.C.'s in the South-East Asian region. They find tremendous discrepancy in reporting and coverage of imports and exports and point to the possible causes for such anomalies. The third article by Bhagwati discusses the general problem of under-invoicing imports. Severe import and exchange control restrictions gives rise to the black market. Underinvoicing of imports requires transactions in this illicit market to pay of the foreign supplier. The main body of the article is an empirical investigation of the Turkish experience. The fourth and last article in this part written by Bhagwati, A Krueger and C. Wibulswasdi is concerned with the question of capital transfer from L.D.C.'s again, a result of exchange controls. Partner-country trade data comparisons are made to see whether overinvoicing of

imports and underinvoicing of exports are used as vehicles of capital flight. It is seen that the former is more restricted as a means of capital flight, than the latter.

The fourth part is entitled: Detecting Smuggling. The first article in this part, by C.G.F. Simikin is an attempt to estimate Indonesia's unrecorded trade by alternative methods. It is found that the unrecorded import was anywhere between 30 % to 48 % of recorded export. This high ratio is a rough indicator of the extent of smuggling. The second article by H.V. Richter is concerned with the problems of assessing unrecorded trade. It deals largely with an appraisal of the methods Simikin used in the previous article to estimate Indonesia's unrecorded trade, which according to Richter is upwardly biased because of overlappings and omissions in official Indonesian data, not adequately accounted for by Simikin. In the last article of this part, R.N. Cooper analyses the effects of prohibitive statutory tariffs on the Indonesia trade sector. The intended revenue and protective effects of tariffs were not realised. Cooper shows that such exorbitant tariff rates only induced smuggling.

The fifth and final part entitled: Miscellany consists of a single article by G.C. Hufbauer and J.P. O'Neill. The article examines the reliability of export unit values as a proxy for prices. Investigation is made into the causes of large variance in unit values of the same item (U.S. machinery) exported to different countries. The highly probable cause of this variance is found in the intra commodity-group diversity.

The book is a positive approach to difficult normative question, since modern trade theory is used to analyse illicit trade practice. What strikes the reader is the conceptual clarity with which every author uses relatively difficult analytical tools in each of their articles. This book is major step forward in the analysis and explanation of illicit foreign trade transactions.

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No. 3

CONTENTS

The Optimum Growth Rate for Population	Paul A. Samuelson
Optimum Social Security in a Life-Cycle Growth Model	Paul A. Samuelson
On the Global Identification of the Dynamic Simultaneous Equations Model with Stationary Disturbances	Michio Hatanaka
Rational Expectations and the Estimation of Econometric Models	Charles R. Nelson
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A Time-Series Fertility Equation : The Potential for a Baby-Boom in the 1980's	Michael L. Wachter
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Investment, Adjustment Costs, and Uncertainty	Roger Craine
Stabilization Policies in an Open Economy : A Taxonomic Discussion	Yoichi Shinkai
Efficient Macroeconomic Stabilization Policies under Floating Exchange Rates	F.R. Casas
Multiperiod Predictions in Dynamic Models	Kajal Lahiri
International Trade with a Wasting but Possibly Replenishable Resource	Murray C. Kemp and Hideo Suzuki
On the Use of Cobb-Douglas Splines	Dale J. Poirier
On VES and WDI Production Functions	Rolf Fare and Leif Jansson
On Cores in Economies with Public Goods	Paul Champsaur, Donald John Roberts, and Robert W. Rosenthal
A Spliced CES Expenditure System	Marjorie B. McElroy
Duality and the Uniqueness of Growth Equilibrium	Takao Fujimoto
On the Efficiency of the Almon Lag Technique	Peter Schmidt and Robin Sickles
Weakly Maximal Optimal Stationary Program under Uncertainty	Itzhak Zilcha
A Note on the Treatment of the Truncation Remainder in the Gamma Distributed Lag	Peter Schmidt

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Introduction

1. Background and Objectives
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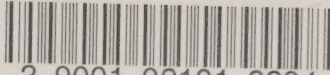
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